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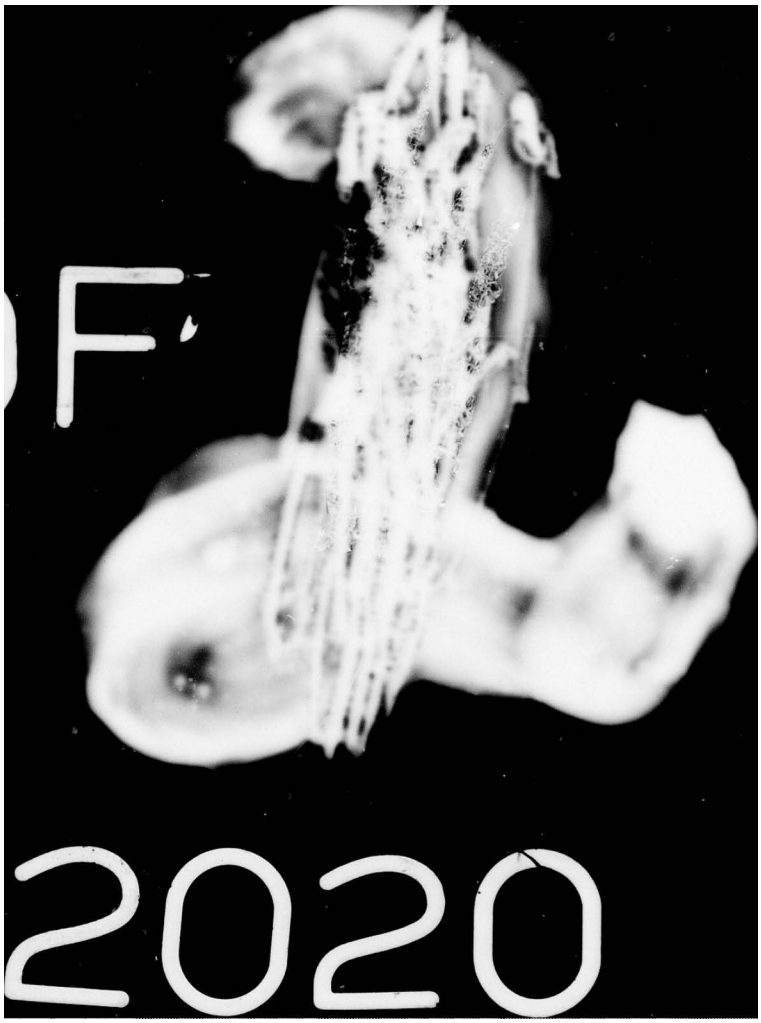
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TECHNICAL REPORT
CAA-TP-79-1

METHODOLOGY TO DETERMINE SUPPORT AND SUSTAINABILITY IMPLICATIONS OF INCREASED POMCUS LEVELS (SSIPL)

30 June 1979

Prepared by

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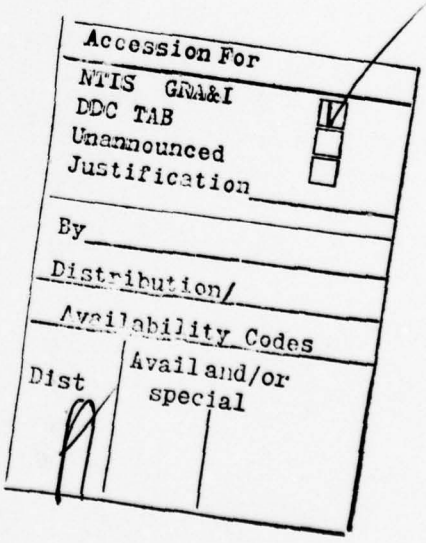
ABSTRACT

This CAA (MOCA-FD) study developed and demonstrated a model, the Balanced Force Model (BALFOR) which assesses force performance implications of a change in the POMCUS issue rates, the maintenance return rates, and the prepositioned war reserve materiel stock (PWRMS) issue rates as they affect the committed tank force. Analysis identified areas where changes in resource allocation among support functions will improve force performance. The report describes the methodology with examples and contains a user and programer guide, in addition to the documentation of the BALFOR Model.



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1. INTRODUCTION. It has long been said that there are only two absolute certainties--death and taxes. This old saying implies that everything else has some degree of uncertainty attached to it. In the defense planning world, at least, that proposition is certainly true. The resulting natural desire to minimize these uncertainties has led to the development of numerous methods which attempt to evaluate the risk in uncertainty by quantifying it. Two of the more common methods are sensitivity analysis and simulation. Sensitivity analysis might be defined as an examination of the change in results brought about by varying the input assumptions over a given range. Similarly, Monte Carlo simulation might be defined as the limiting case of a sensitivity analysis in that a very large range of data points are considered.

a. One group of simulations used at the Army's Concepts Analysis Agency (CAA) is the OMNIBUS Study. Its purpose is to assist the Army Staff in the allocation of resources and development of priorities in evaluating the readiness of the current US force.

b. OMNIBUS Studies have concluded that the combat force effectiveness is limited by shortfalls in the part of the force which sustains equipment committed to battle--called the combat service support (CSS) capability. However, there is no existing methodology to express these shortfalls in terms which allow a force designer to assess tradeoffs in distributing available fiscal or equipment resources between combat units and support units in developing the most effective force.

2. PURPOSE. The purpose of this paper is to describe a methodology developed at CAA which fills the gap in the Army's ability to analyze the relationship between CSS and the committed force. Central to this methodology is a deterministic simulation, the Balanced Force (BALFOR) Model. The term "balanced force" refers to an improved distribution of resources between combat and CSS units. The BALFOR resources model measures the strength of the combat force as a function of the CSS ability to sustain the force. With sufficient sustainability, the committed strength is no longer constrained by inadequate personnel and equipment resupplies, maintenance units, or transportation capabilities for these supplies.

3. BACKGROUND. During FY 79 CAA directed its attention to force sustainability in an analysis of the FY 82 force. The Army is considering the costly option of prepositioning additional unit sets of equipment in Europe as POMCUS (prepositioning of materiel configured to unit sets) rather than placing it in prepositioned war reserve materiel stocks (PWRMS). In the FY 80-84 Consolidated Guidance, DOD directed the Army to appraise this option. The guidance led the Army Staff to raise the question, "What is the optimum level of POMCUS for the Army?"

a. To answer this question, CAA compared the performance of two FY 82 force designs. The equipment was added to increased POMCUS in the first force. In the second force, the equipment was put in PWRMS while retaining the FY 78 level of POMCUS. The force design was unaffected by the placement of additional equipment; both force designs performed equally, because the ability of maintenance units to process combat damaged equipment constrained each force.

b. CAA then contrasted these two forces with a third design: a modified FY 78 force with increased maintenance capability. To implement this, three force improvements were assumed: an increase in the maintenance return rate, an increase in the PWRMS issue rate, and placement of equipment added to the FY 82 cases in PWRMS. This modified FY 78 force outperformed both FY 82 forces due to an increased sustainability achieved through the relaxing of maintenance constraints.

c. At this point CAA responded to the Army inquiry concerning an optimum POMCUS level with three conclusions.

(1) First, this level could not be determined in isolation because it was a function of force sustainability. Sustainability depends on at least four variables: the level of PWRMS, the POMCUS site issue rate, the maintenance repair rate of combat damaged vehicles, and the supply issue rate of combat vehicles from PWRMS.

(2) The second conclusion was that no methodology presently available was able to determine the optimum POMCUS level because the tradeoff between increased POMCUS and increased CSS to sustain the force was not determinable.

(3) If the POMCUS level is considered in isolation from the sustainability requirements, the value of the planned addition of combat forces is primarily in the deterrent value. Should this deterrent fail, however, only that part of the combat force which can be sustained will increase the survivability of the NATO alliance.

4. THE BALFOR METHODOLOGY. In an attempt to give a more complete response to the ramifications of POMCUS levels and sustainability, CAA conceived of a three-step methodology to alleviate the present methodology deficiencies. The approach begins with developing the BALFOR simulation to establish the functional relationship between POMCUS levels and sustainabilty. The next step is to use sensitivity analysis to establish how sensitive the BALFOR Model is to its inputs and to determine what effect changes in the model input assumptions produce on the conclusions drawn from model output. The final and unimplemented step is to change the BALFOR Model from its present form as a deterministic simulation to a probabilistic simulation. This step is an extension of sensitivity analysis because the conclusions may be stated with a corresponding measure of confidence or accuracy.

5. RELATIONSHIP OF BALFOR TO OTHER CAA MODELS. Before detailing the operation of the BALFOR Model, the three-step methodology will be contrasted with earlier methodologies available at CAA in the TRANSMO, CEM, FASTALS, and match methodologies. A brief description of these projects appears in the glossary of this document.

a. There are three key advantages in the BALFOR procedure.

(1) The BALFOR simulation, which models unit deployment, warfighting, and CSS in a single algorithm, is quick and efficient to use. Changing inputs to the model is a trivial step and computer execution time for a 60-day war is just a couple of minutes. The earlier methods are time consuming and require several months to study a single case.

(2) One of the key breakthroughs in the BALFOR methodology is the selection of a common measure of effectiveness for combat units and CSS units. For example, the OMNIBUS-77 and -78 Studies have recognized shortfalls in the CSS capability but have not been able to evaluate the effect of increasing CSS on the effectiveness of the force. Two features of the BALFOR Model equate combat units and CSS. First, maintenance is presented in the form of units rather than simple rates of maintenance returns of combat damaged equipment. Figure 1 (pg 8) shows the flow of maintenance and combat units through the model. The BALFOR Model uses the maintenance units in a detailed system which allows specific stopgaps in the maintenance system to be identified. The second feature is the choice of a committed combat weapon system--tanks--on FEBA from M to M+60 as a common measure of effectiveness of both combat and support units.

(3) The third advantage is the ability of the BALFOR simulation to express tradeoffs in distributing resources between

combat units and CSS. The model allows each of the variables described above which affect sustainability, specifically the level of PWRMS, the POMCUS site issue rate, the maintenance repair rate of damaged vehicles, and the supply issue rate of combat vehicles from PWRMS, to be changed. The effect of the changes can then be observed in the committed tank strength at FEBA. Putting the second and third of these advantages together allows one to determine an improved level of POMCUS after adjusting sustainability variables so that a balanced force is achieved.

b. In view of these advantages, the BALFOR methodology is compatible in two ways with earlier CAA methodologies. On the one hand, many BALFOR Model inputs are derived from the WARF, CEM, TRANSMO, FASTALS, and match methodologies. On the other hand the detailed BALFOR maintenance system can ameliorate maintenance repair rates and maintenance unit deployments input to these earlier models. An overview of these two items underscores the BALFOR Model compatibility with the existing methodology.

(1) Deriving BALFOR Inputs. The BALFOR Model is capable of using deployment sequences of units from TRANSMO, permanent loss rates from WARF, or combat loss rates from CEM. The loss rates for equipment and personnel are compatible with CEM, and the maintenance unit capabilities and heavy equipment supply capabilities are compatible with FASTALS.

(2) Refining Maintenance Rates and Deployments. If the maintenance units and heavy equipment supply companies used in the BALFOR Model are reduced from authorized strengths to actual levels, the simulation will reflect a degraded maintenance unit capability. This more realistic capacity can then be applied to the CEM inputs. Consequently the validity of CEM results, which is highly sensitive to both the maintenance return rate and the PWRMS issue rate, will increase. The BALFOR Model provides the rationale to increase maintenance unit deployment priority because the early arrival of these units can increase committed unit sustainability.

c. While BALFOR is compatible for the most part with other CAA methodologies, it is, independent of the source of its inputs. Earlier CAA methodologies took months to complete because each model depended on the others for inputs, but the BALFOR Model can be used outside CAA because the user is free to derive model inputs from any sources he chooses. For example, the deployment sequence for BALFOR can be developed from Army planning documents instead of the TRANSMO outputs. A major need in implementing the third and final step in the BALFOR Methodology, in which the deterministic model is transformed into a probabilistic model, is obtaining

combat damage distribution and repair times for equipment types other than tanks. Minimally, the repair times for all major weapon systems--track vehicles, missile systems, and helicopters--is needed.

6. BALFOR MODEL OPERATION. This section describes the algorithm used in the BALFOR simulation. The model operates on an event cycle repeated at the beginning of each day. In this cycle is simulated functions by combat units, unit maintenance units, DS and GS maintenance companies, depots and heavy equipment supply companies, a theater stock control center, and an overseas replacement personnel center. The following list details the functions each of these items performs.

(1) Combat unit functions:

- Receive orders (arrival, commitment)
- Conduct operations
- Assess losses
- Evacuate wounded personnel and damaged equipment
- Requisition personnel losses and equipment replacements
- Receive replacement personnel
- Receive repaired and replaced equipment

(2) Unit maintenance functions: (Division maintenance and forward DS units)

- Schedule remaining repairs (nonbattle repair before combat damaged)
- Receive repairable equipment
- Evacuate overflow workload
- Evacuate repairables to GS maintenance units
- Evacuate uneconomical repairables to COMMZ
- Repair equipment
- Return repaired equipment to units

(3) Rear DS and GS maintenance functions:

- Receive arriving DS and GS units
- Schedule repairs
- Receive unit maintenance overflow (rear DS only)
- Receive evacuated GS repairables (GS only)
- Repair equipment
- Report repaired equipment to the theater stock control center

(4) Depot and heavy equipment supply unit functions:

- Receive arriving heavy equipment supply companies
- Receive CONUS major item resupply
- Allocate supply resources among major items
- Process major items for issue
- Report ready for issue equipment to theater stock control center

(5) Theater stock control center functions:

- Maintain unit equipment status
- Maintain unit back orders
- Maintain theater equipment status
  Available from maintenance
  Available from supply (PWRMS and CONUS resupply)
  Unit back order
  In transit to units
- Receive unit crew availability from the theater replacement center
- Schedule equipment arrival at units
- Ship equipment to units

(6) Theater replacement center functions

- Maintain unit personnel status
- Receive CONUS individual replacements
- Receive hospital returns to duty
- Allocate available personnel to units
- Ship replacements to units

A better grasp of these functions can be obtained by considering the flow of equipment and personnel separately. The theater equipment flows in BALFOR are shown in Figure 1. The arriving combat units are divisions and brigades with organic maintenance units. Arriving CSS units are DS maintenance, GS maintenance, and heavy equipment supply companies. The arriving maintenance companies increase the maintenance return rate of damaged tanks to theater stocks, and the heavy equipment supply companies increase the rate at which tanks from PWRMS stocks and CONUS resupply equipment can be prepared for issue to units. Theater personnel flows are shown in Figure 2. Crew personnel arrive with combat units. Individual unit replacements to replace crew losses are scheduled based upon DCSPER estimates of replacements by career group. Returns to duty from in-theater hospitals and the CONUS evacuation rates are based upon the theater evacuation policy.

a. Force Relationships. The combined interaction of personnel and equipment is illustrated in Figure 3. This flow diagram shows four types of units being committed to the FEBA: on station units; POMCUS units; Active Army, non-POMCUS units; and Reserve Component units. The on station units are committed immediately. The remaining Active Army and Reserve units are committed after arrival. Unit personnel and equipment first assemble and then move to FEBA.

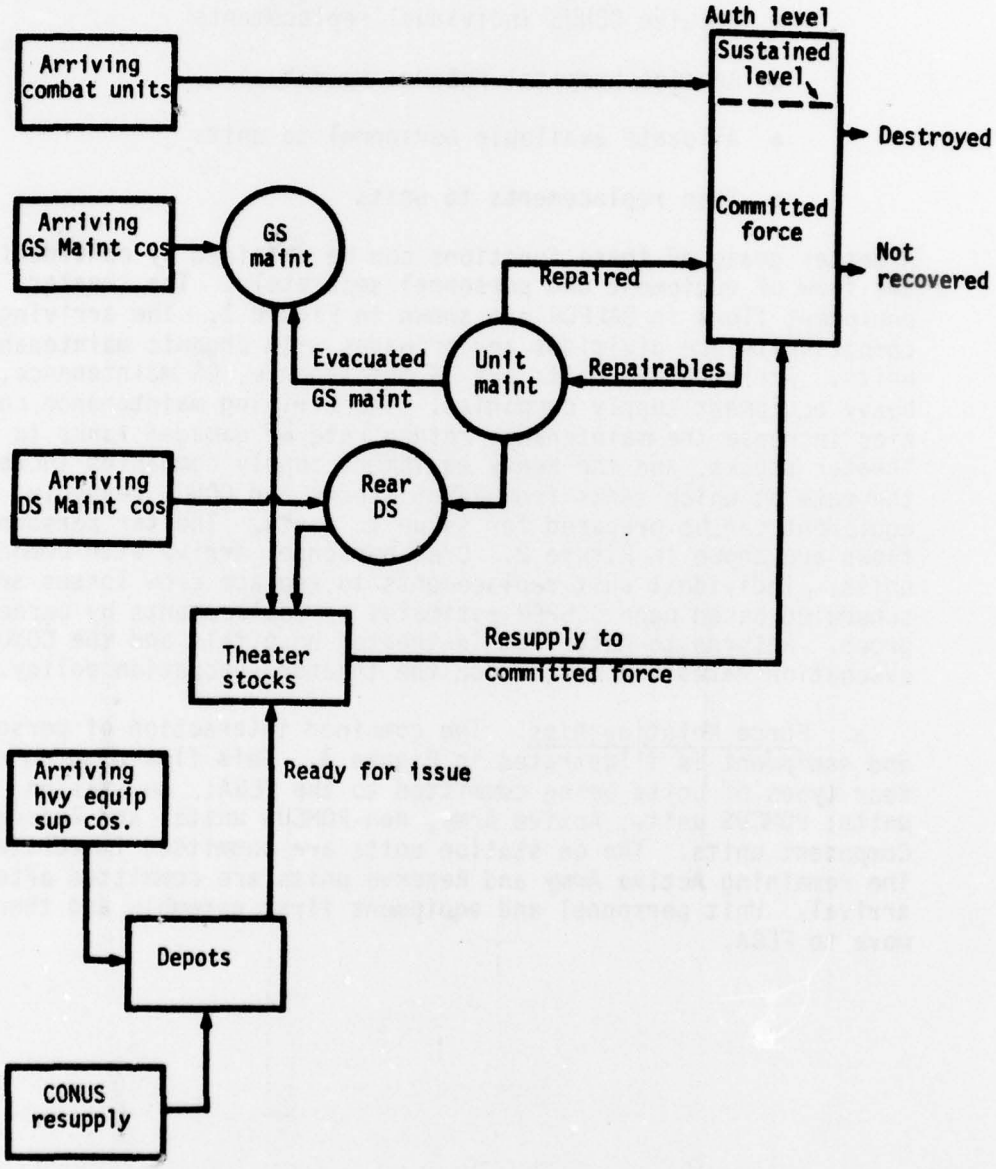

Figure 1. Theater Equipment Flows

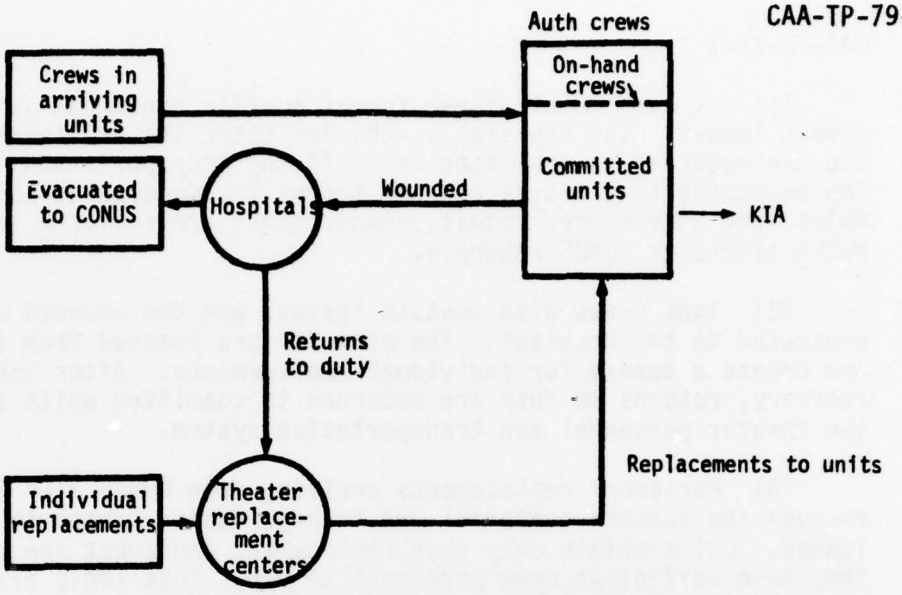

Figure 2. Theater Personnel Flows

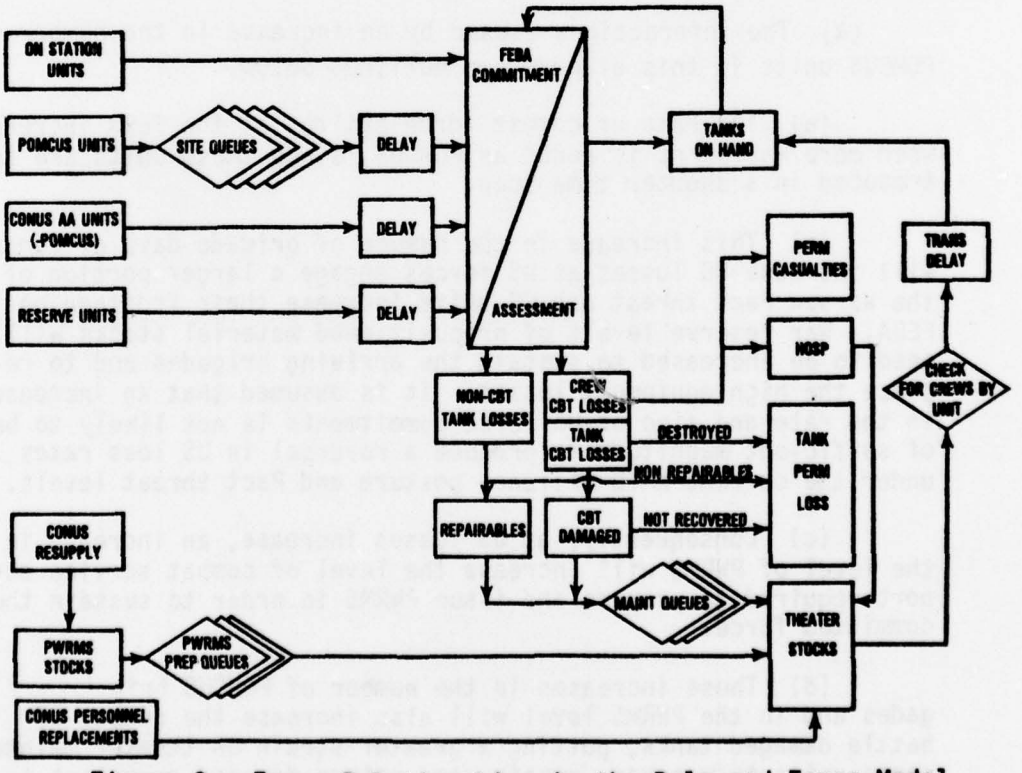

Figure 3. Force Relationships in the Balanced Force Model

(1) At commitment, these forces sustain noncombat as well as combat losses. The repairable vehicles enter the maintenance loop and are returned to committed units in the transportation loop. The permanent tank losses represented by the destroyed, nonrepairables, and unrecovered combat damaged tanks are replaced from PWRMS stocks or CONUS resupply.

(2) Tank crews also sustain losses, and the wounded are evacuated to the hospital. The crew KIA are removed from the unit and create a demand for individual replacements. After hospital recovery, returns to duty are returned to committed units through the theater personnel and transportation system.

(3) Personnel replacements arriving from CONUS also flow through the theater personnel and transportation system to replace losses. Units obtain only that replacement equipment for which they have sufficient crew personnel to man. This logic allows the availablity of tank crewmen to be compared to the availability of replacement tanks from theater stocks.

(4) The interactions caused by an increase in the number of POMCUS units in this diagram are outlined below.

(a) The rate of combat force buildup at the FEBA increases when more equipment is added as POMCUS, since these units are introduced in a shorter time span.

(b) This increase in the number of brigade days of combat will increase US losses as US forces engage a larger portion of the Warsaw Pact threat and US units increase their frontage on the FEBA. War reserve levels of prepositioned materiel stocks will need to be increased to sustain the arriving brigades and to replace the high equipment losses. It is assumed that an increase in the rate and size of US force commitments is not likely to be of sufficient magnitude to produce a reversal in US loss rates under the current NATO alliance posture and Pact threat levels.[17]

(c) Consequently, as US losses increase, an increase in the level of PWRMS will increase the level of combat service support required to prepare and issue PWRMS in order to sustain the committed force.

(d) These increases in the number of POMCUS brigades and in the PWRMS level will also increase the number of battle damaged tanks, putting a greater strain on theater maintenance units to recover, repair, and return damaged equipment to the force.

b. Selection of GASP IV Simulation Language and the Gately Optimization Routine. The BALFOR Model is a computer simulation program which uses the popular GASP IV simulation language. Three outstanding features of GASP IV motivated its choice. First, this language is implemented in FORTRAN, which is the most widely employed and hence compatible language at CAA. Second, GASP IV is unique in that it allows continuous events (such as the continual losses of equipment and personnel from the committed force throughout the simulation) and discrete events (for example, the arrival of a CONUS resuppply of personnel) to be modeled together in a single simulation. The final and most crucial feature of the GASP IV language is the availability of the Gately optimization routine. From its conception, the BALFOR Model appeared most useful in answering questions concerning optimum levels, such as the optimum level of POMCUS and WRS or the optimum distribution of resources. Whenever a computer simulation is used to find the optimum solution to a problem, it must repetitively simulate each possible solution. Then a better solution can be chosen from the result of each repetition. The Gately routine not only automatically performs this task, but it attempts to save computer time by predicting which solutions will not be an improvement before they are simulated.

7. FORCE ASSUMPTIONS. The simplifying assumptions which are made in using the model are described below.

a. Ammunition and POL resupply were not modeled in this initial effort in order to limit the scope of the modeling task. It is assumed that ammunition and POL resupply can be provided to units without using the resources of theater maintenance and heavy equipment supply units.

b. Transportation units in the corps area were also excluded from the initial modeling tasks. It is therefore assumed that the transportation required to evacuate damaged tanks and to deliver major items from PWRMS and CONUS resupply are available.

c. The model assumes no attrition or interdiction to CSS support units and facilities. Attrition and interdiction can be assessed within the methodology but have not been included in this phase, again to limit the scope of the problem.

d. The model assumes full availability of the repair parts needed to repair both combat and noncombat losses. The model can be refined in the future to reflect maintenance backlogs due to nonavailability of repair parts.

8. FLOW CHART/STRUCTURE. A flow chart of the distribution for equipment losses and maintenance processing is shown in Figure 4. Division and forward DS maintenance companies return tanks directly to the combat units from which they originated. Rear DS and GS maintenance units report repaired equipment to the stock control center which manages the distribution of repaired items to all units. The maintenance policies which govern the echelon at which repair is accomplished are listed in Table 1 and depicted in Figure 4. Uneconomical repairables are assumed to be evacuated to COMMZ and are not available for reissue to corps units.

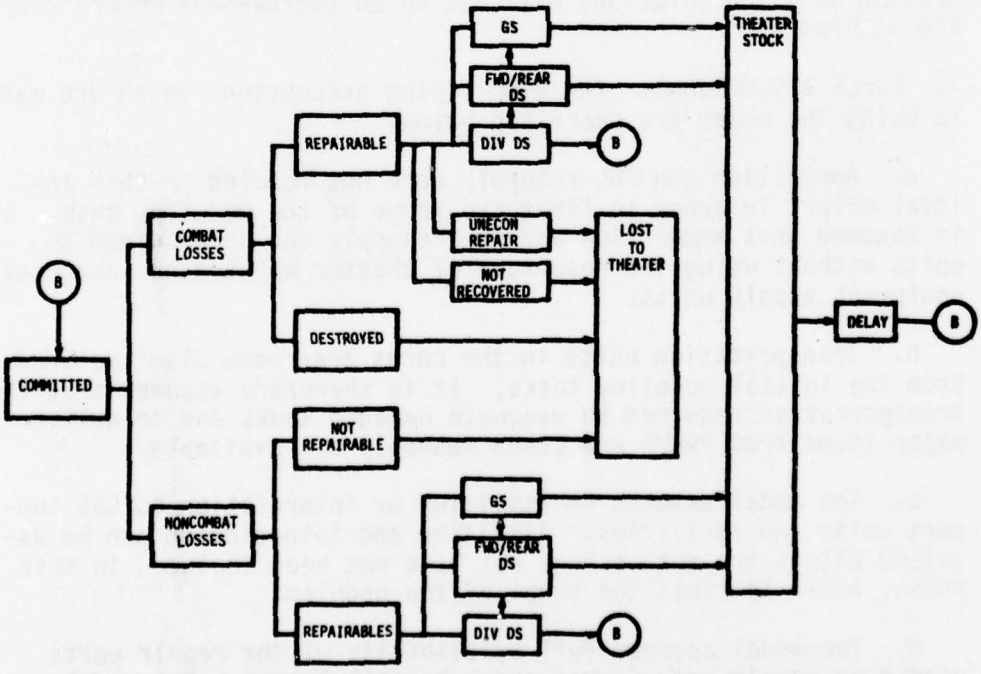

Figure 4. Distribution of Equipment Losses and Maintenance Processing

(U) Table 1. Maintenance Policy/Definitions

- Damage requiring > 48 maint man hrs = GS
- Damage requiring < 48 maint man hrs = DS
- Damage requiring > 96 maint man hrs = nonrepairable in corps
- Max backlog in div maint bn = 2 days
- Max backlog in TOE 29-207H = 2 days
- No limit on backlog in TOE 29-137H
- Unit capability to repair stated in TOE summary

9. DESIGN CONSIDERATIONS. The original objective was to model only the CENTAG tank force. This objective was modified when it became necessary to make judgments on how support would be distributed between CENTAG and NORTHAG units. When a theater is constrained for combat service support, the theater commander must allocate available support. The best known historical example of CSS allocation was the decision to provide CSS to Montgomery instead of Patton after the breakout from Normandy. The allocation of CSS between committed US units poses the same problem for planners today. The revised modeling objective was to model the US units in the AFCENT tank force. This objective allowed available support to be distributed to all US units in AFCENT in proportion to need.

10. SAMPLE RESULTS

a. The first example using the BALFOR Model measures the effects of the modeled combat service support functions on the combat force. Expected values for model inputs were derived from the OMNIBUS-79 data base and other current CAA studies.[17,18,19,22,23] The force size was scaled to represent the commitment of a 1000 tank force. This force is shown in Figure 5 for a type corps.

(1) The force was simulated in the BALFOR Model without providing the committed tank force maintenance or supply support of any kind. There were no returns to the committed force from the division maintenance battalions, DS and GS maintenance companies, or resupply to combat units from theater stocks (Figure 5). The results of this simulation are shown in Figure 6, which displays the decay of the committed force without maintenance support, PWRMS tank issue, tank resupply from CONUS or tank crew replacements. At D+50 only 8.8 percent of the 1000 tanks committed to FEBA remained.

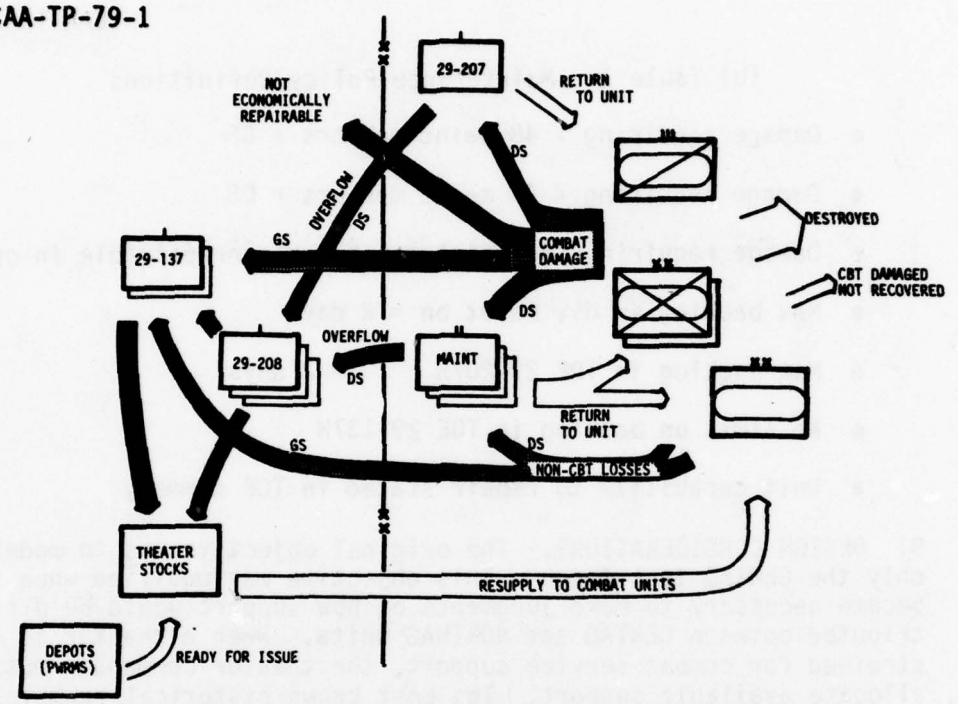

Figure 5. Maintenance Support of Tanks

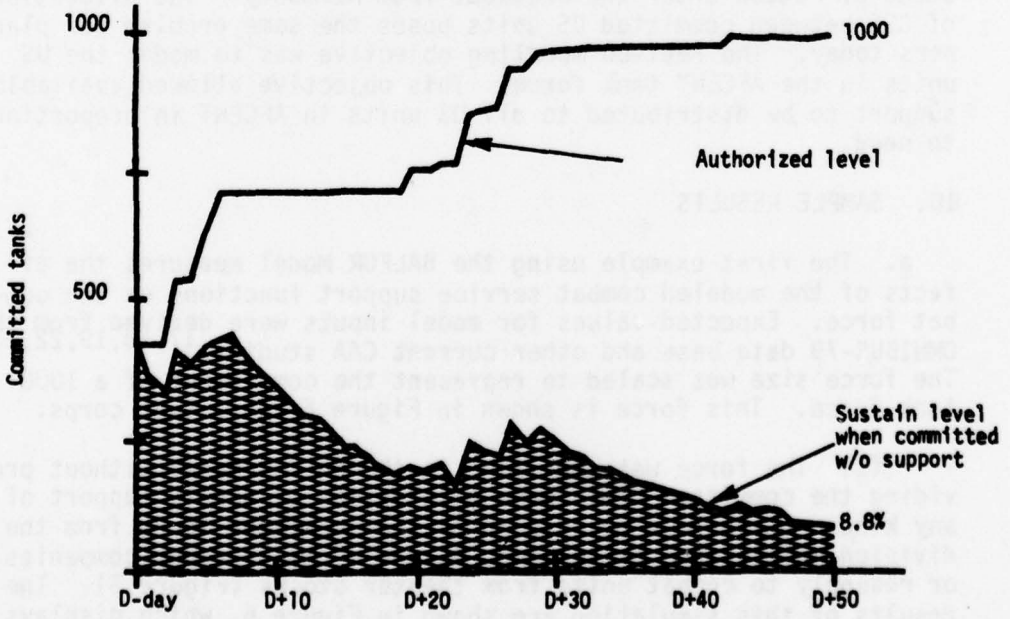

Figure 6. The Sustain Level of the Committed Tank Force Without Maintenance, PWRMS, or Resupply Support

(2) The next simulation in the first example added direct support and general support maintenance to provide returns of repairable noncombat and recovered combat damaged tanks to the force. The committed tank force is sustained at 29 percent of authorization at D+50 (Figure 7).

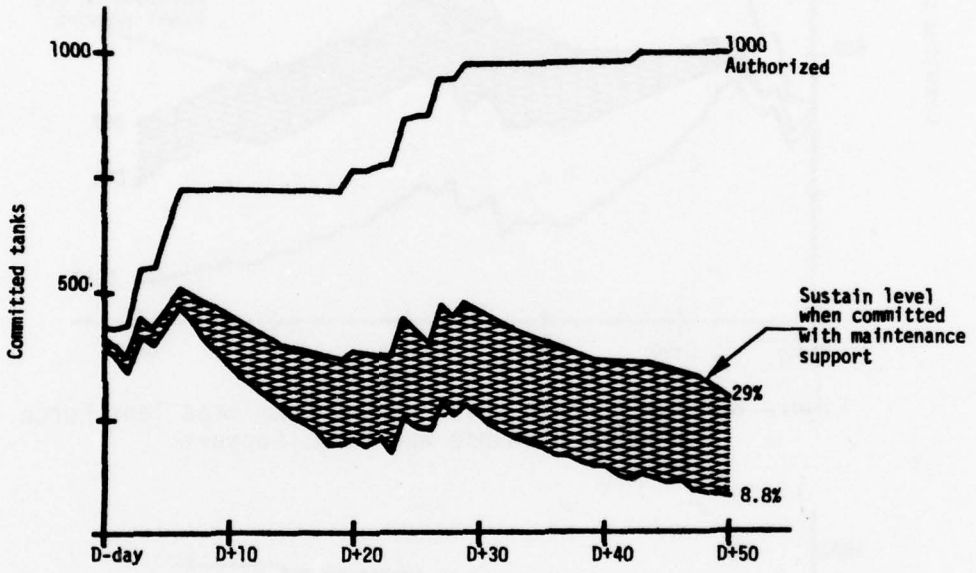

Figure 7. The Sustain Level of the Committed Tank Force With Maintenance Support

(3) The next simulation added resupply of tanks to combat units from PWRMS. PWRMS stocks not only contribute support to the committed force through rapid replacement of early losses, but also increase the number of repairable tanks which are repaired and returned to the committed force through the DS and GS maintenance cycles. The addition of tanks in PWRMS sustains the forces at 39 percent of authorization at D+50 (Figure 8).

(4) The last simulation added CONUS resupply which is made up of POMCUS leave behind and CONUS war reserve stocks. The effect on the committed force is again twofold: (1) a source of replacement for unit losses, and (2) maintenance returns through the maintenance system. The addition of resupply sustains the committed tank force at 55 percent of authorization (Figure 9).

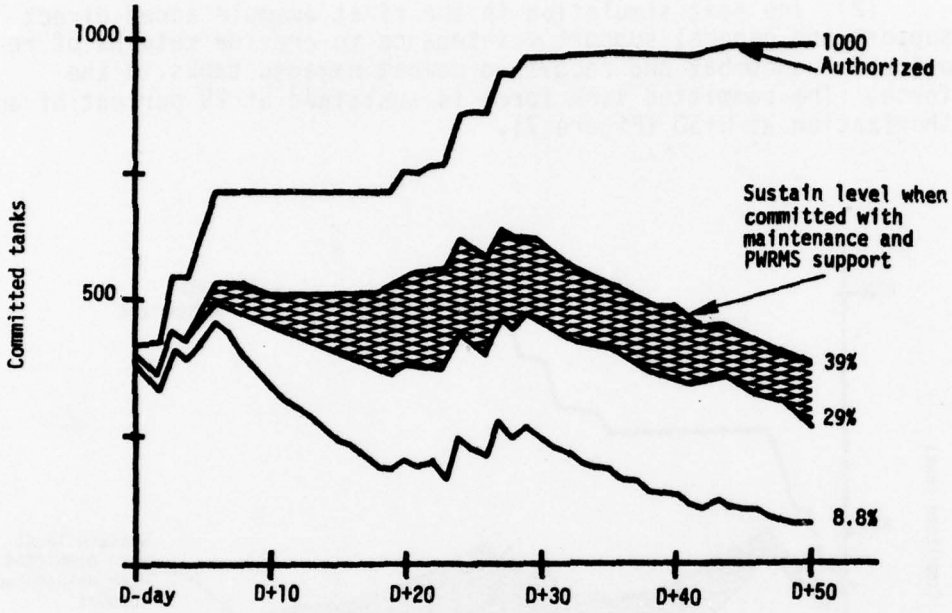

Figure 8. The Sustain Level of the Committed Tank Force With Maintenance and PWRMS Support

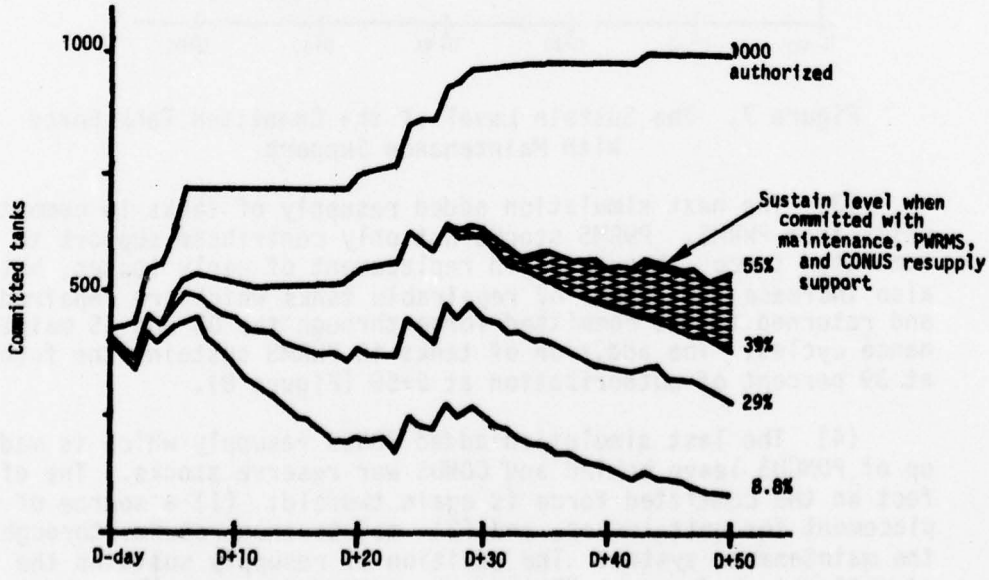

Figure 9. The Sustain Level of the Committed Tank Force With Maintenance, PWRMS, and CONUS Resupply Support

(5) The difference between the authorized curve and the sustained level is accounted for by three constraints: (1) a portion of the 1000 tanks in committed units unsupported with the PWRMS tanks, (2) the response delay of the theater supply and maintenance systems, and (3) the lack of crew replacements to man tanks in the D to D+15 time period. The theater transportation is measured in the model by tanks in transit to units, Figure 10. The theater maintenance delay is measured by the tanks remaining in maintenance at the end of each day. Also shown in Figure 10 are the tanks which are not shipped because units did not have crews for them.

(6) This example with its four simulations illustrates the use of the BALFOR Model in measuring the effects of CSS support on the committed force. These effects are measured in both magnitude and duration. Also measured is the impact of personnel replacements.

b. The second example utilized the BALFOR Model to examine the sensitivity of model results to changes in input values over a range of values. The same tank force used in the first example is also used in the second example. The expected values which provided base case values were again derived from the OMNIBUS-79 data base. The relationships of the committed tank force to three of the four sustainability variables--(1) the level of PWRMS, (2) the PWRMS ready for issue (RFI) rate, and (3) the POMCUS site issue rate--are shown in this example. Also, the risks associated with the estimates of attrition and recovery of damaged vehicles will be shown.

(1) When the PWRMS level is doubled from 287 to 574 tanks in PWRMS, the force is sustained at 64 percent of authorization (Figure 11). As PWRMS is doubled, the tank crew shortage which constrained the committed tank force in the last example is extended through D+23. These crew results are obtained by using the data analysis features of GASP IV.[31] For example, GASP IV routines collect and print in table and graph form any of the variables computed by the BALFOR Model. In this case the number of tanks which are not issued because units lack tank crews to man them is a model variable.

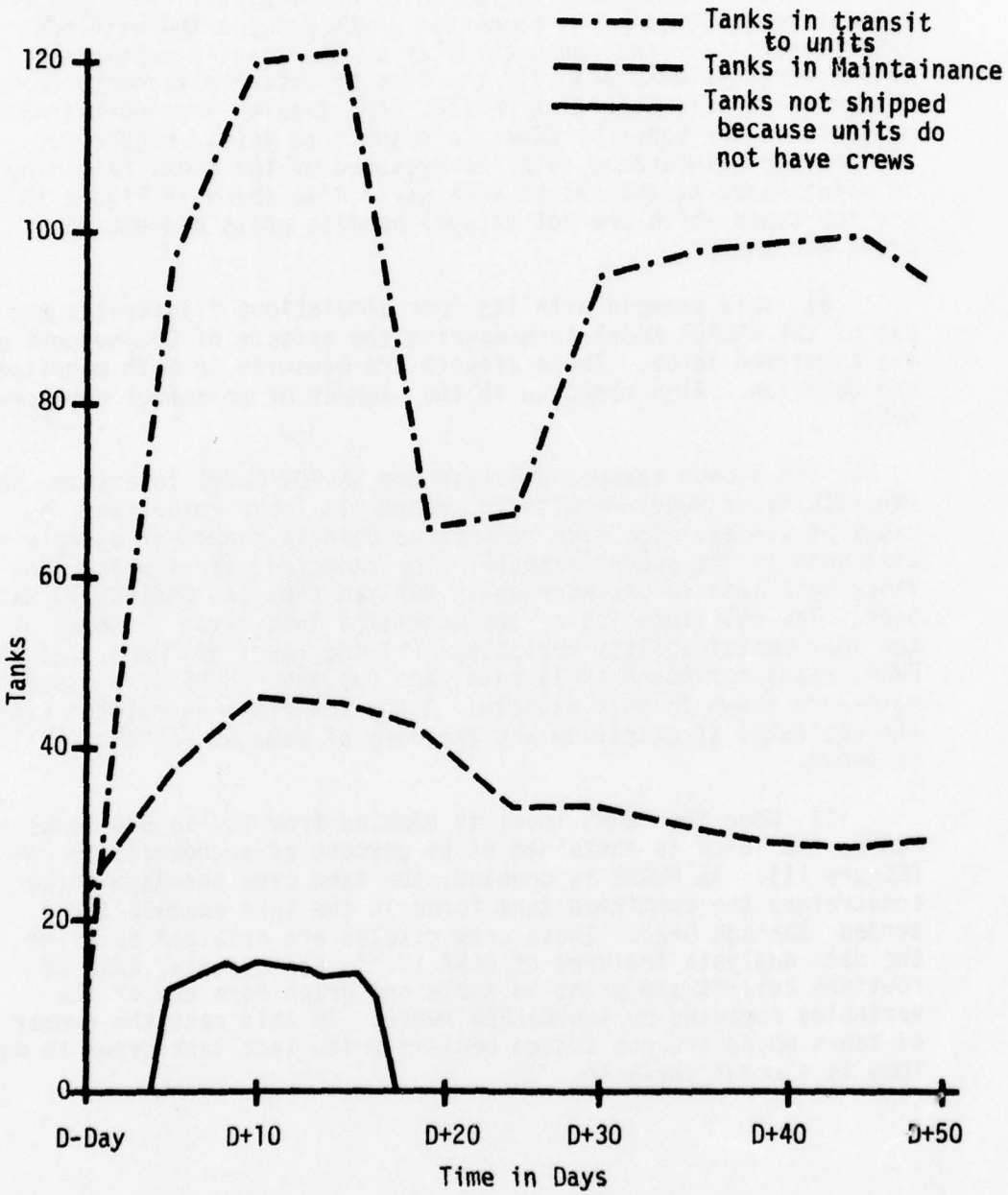

Figure 10. Tanks in Transit to Units, Remaining in Maintenance, and Not Shipped Because of Crew Shortages

(2) The next sensitivity run was conducted on the PWRMS issue rate. When the PWRMS issue rate is cut in half from 11 tanks a day, the tank force is sustained at 46 percent of authorization. PWRMS processing begins at M-day and a buildup of tanks in theater stocks is obtained before D-day. This buildup cannot be maintained at a processing rate of six tanks a day from PWRMS, and the effect on the committed tank force is seen as a decrease beginning at D+10 and extending through D+50 (Figure 11).

(3) The third sensitiviy run was conducted on the POMCUS site issue rate. The effect of greater POMCUS site issue delays (four days) on the committed tank force at D+50 is small. The impact of time delays in the commitment of the POMCUS force is seen in the committed tank force between D and D+10 (Figure 11). Although represented as POMCUS site issue delays, other time delays which affect the arrival and commitment of the POMCUS units would have the same impact. Other probable causes of time delays of the POMCUS units are weather conditions at the aerial ports which cause diversions of aircraft into other European airfields, chemical contamination of POMCUS stocks which could delay issue until decontamination was completed, and damage to the POMCUS sites which required salvage and cleanup delays at the sites. The impact on the committed units of an additional four days before relief or reinforcement is not addressed in this methodology.

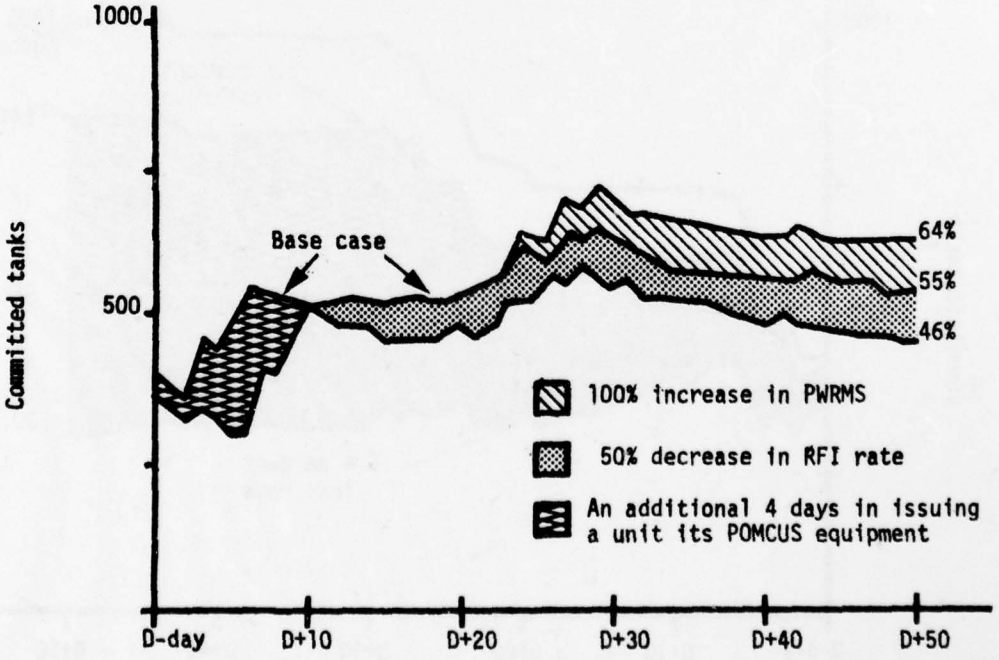

Figure 11. The Effect of (1) an Increase in the Level of PWRMS, (2) a Reduction in the Ready-for-Issue Rate of PWRMS, or (3) an Increase in the Issue Rate at POMCUS Sites

(4) The fourth sensitivity run was a test on the attrition rates. The loss rates used in the base case were derived from the OMNIBUS-79 scenario but many threat and equipment variables affect the loss rates in a theater simulation. In this case, the 6.2 percent per day combat loss rate and a 1 percent per day noncombat loss rate were first decreased by 50 percent and then doubled. At the lower attrition levels of 3.6 percent per day, the PWRMS plus resupply tank level and the ready for issue rate are sufficient to replace the losses to the force. Tanks counted as permanent losses are (1) unrepairable noncombat damaged tanks, (2) damaged tanks not recovered, (3) uneconomically repairable tanks, and (4) the destroyed tanks. The maintenance system at the 3.6 percent loss level is also able to return to the committed force all noncombat losses and all combat damaged tanks that are economically repairable. Only the response lag of the theater maintenance and transportation systems keeps the committed tank level from reaching authorized levels. At higher loss levels, the tanks being added to the committed force in (1) reinforcing units, major item replacement (2) from PWRMS, and (3) from repair in the maintenance system are not sufficient to increase the committed tank force at FEBA after D+6 (Figure 12).

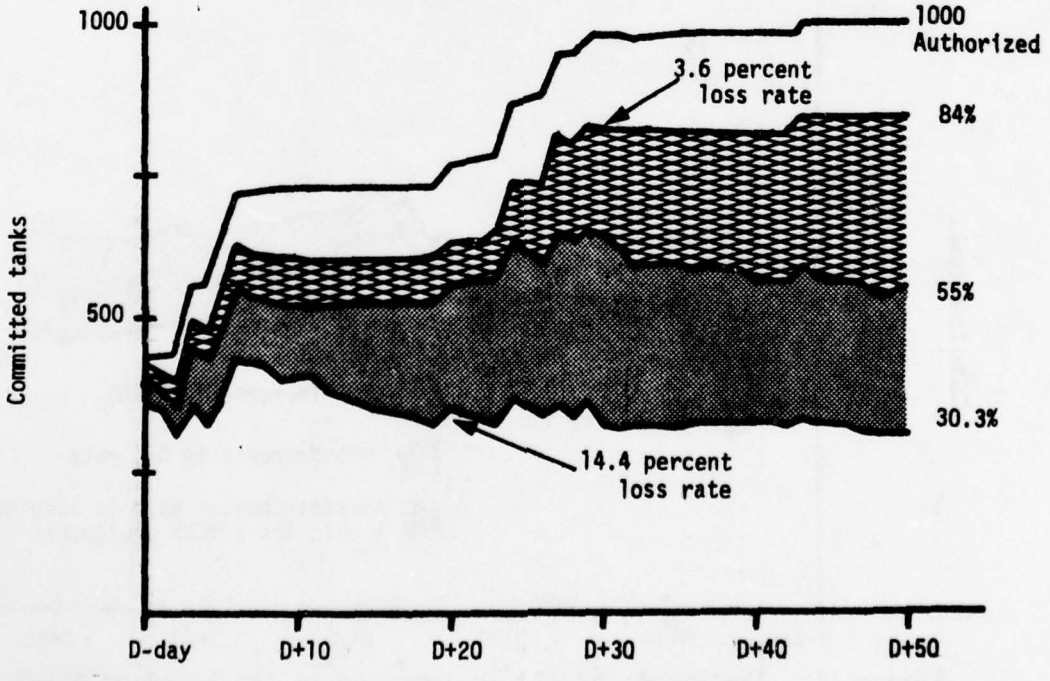

Figure 12. The Effect of (1) an Increase in Combat and Noncombat Loss Rates and (2) a Decrease in Loss Rates

(5) The last sensitivity run of example two evaluated the risks associated with estimates of the recovery rate of damaged vehicles. The recovery of damaged vehicles implies the retention of territory and is estimated at CAA in terms of adverse FEBA movement. The average FEBA movement in OMNIBUS-79 runs was used to obtain the base case value of 98 percent recovery. The 50 percent recovery rate used in this example was selected because of the importance of this variable to the maintenance and supply functions being modeled in BALFOR. PWRMS levels are planned on the basis of the number of tanks in the committed force expected to be destroyed in a given period of time. These PWRMS levels will not support the force when the level of vehicle recovery is low, because for each damaged tank not recovered, one must be processed and issued from PWRMS. The maintenance system is sized to return combat damaged vehicles to the force. Low levels of vehicle recovery will result in unused maintenance capacity. Recovery is also a wartime function added to a maintenance system trained in peacetime repair. The effect of reducing the recovery estimate from 98 percent of damaged vehicles to 50 percent is a 16 percent reduction in the committed force at D+50 (Figure 13).

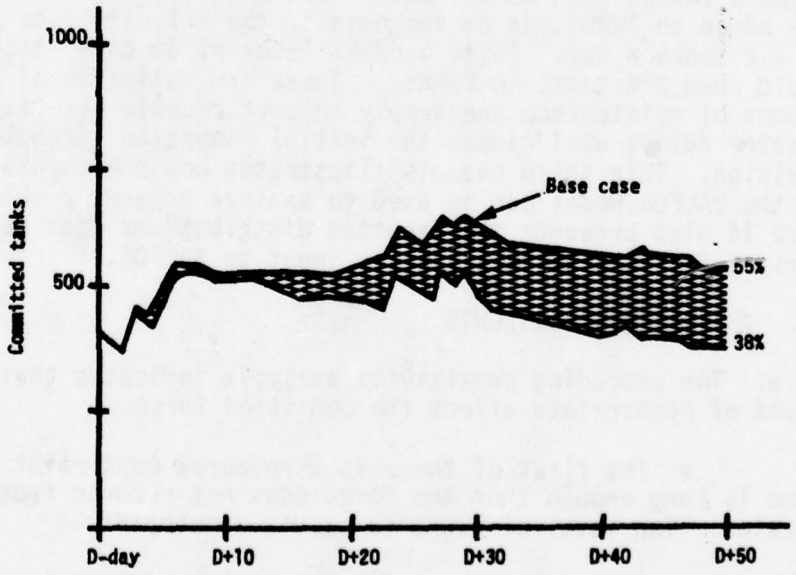

Figure 13. The Effect of a Reduction in the Recovery Rate of Combat Damaged Vehicles on the Committed Force

(6) This second example with five sensitivity simulations illustrates the use of the BALFOR Model in performing sensitivity tests on input variables. These sensitivity tests show how the risk levels associated with estimates of important force variables can be established.

c. The third example estimates the support increase required when one mechanized infantry division is added to the force. The example assumes that the division would be added to POMCUS, but the estimation applies equally to on-line, POMCUS, and other arriving divisions with the same equipment. The example applies to the current as well as the FY 82 and FY 85 forces. The model is run with 1000 tanks committed and then scaled to get values for a mechanized division. The input distributions of losses are shown in Figure 14. Not shown are the repair times for each category of maintenance. These are added in the lower right hand corner of Figure 14 and the DS and GS maintenance hours required to repair the tanks delivered to DS and GS maintenance units is calculated for 1000 tanks (614 manhours at the GS level and 396 manhours at the DS level). The total losses to the theater are 30 tanks a day. These results are next scaled to the 306 tanks in a mechanized infantry division. The support required by the arriving division is 121 hours of DS and 188 hours of GS maintenance. When theater losses are scaled, each division would need 9.2 tanks a day added to PWRMS and an increase in the RFI rate from the depot of 9.2 tanks a day. (With a PWRMS level of 30 days, each division would need 276 tanks in PWRMS.) These are estimates of the upper bounds of maintenance and supply support because attrition and theater delays will reduce the initial committed strength of the division. This third example illustrates how the inputs and logic of the BALFOR Model can be used to analyze support problems. Figure 14 also presents the expected distributions that have been derived from the CODAM Study for input to BALFOR.[16]

11. ANALYSIS AND INSIGHTS

a. The preceding sensitivity analysis indicates that three types of constraints affect the committed force.

- The first of these is a resource constraint whose lead time is long enough that the force does not recover from the constraint. The level of PWRMS is such a constraint.

- The second type of constraint operating is a phasing constraint where the rate of delivery of the resource constrains the force. Tank crew replacements are phasing constraints. It is not the quantity of the resource but the rate of delivery which constrains the force. If PWRMS levels are increased, capability to issue PWRMS at a faster rate also has to be added.

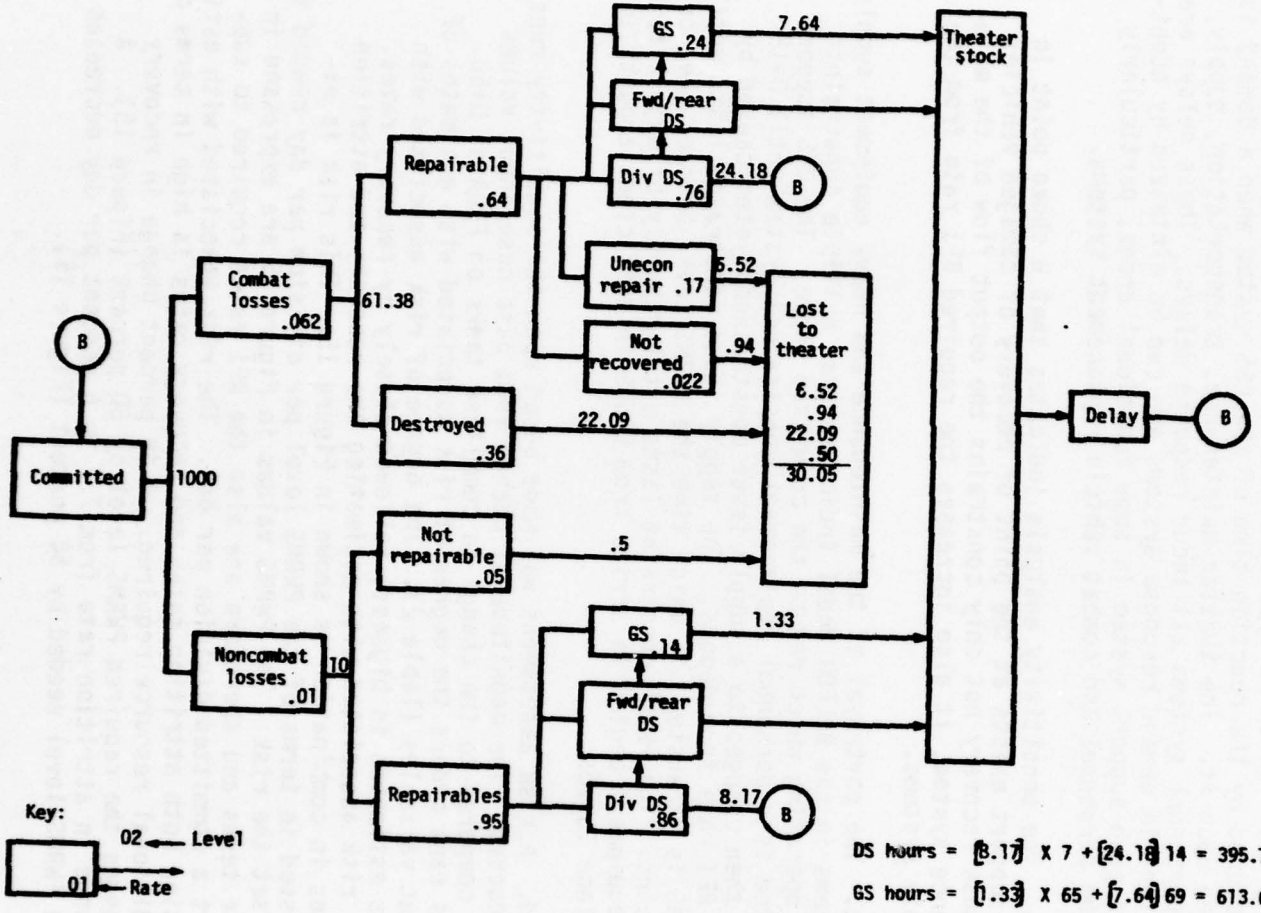

Figure 14. DS and GS Workloads

• The third type of constraint is a system response delay caused by the reaction time of the CSS system when a demand is placed upon it. The theater maintenance, transportation, supply, and personnel systems all incur response delays. These delays are inherent in demand response systems and can be minimized by adopting a push support system in some functional areas, particularly in the personnel and combat vehicle replacement systems.

b. The sensitivity analysis indicates that a choke point in CSS support exists at the point of recovery of damaged vehicles because recovery not only constrains the output flow of the maintenance system, it also increases the required RFI rate from the supply systems.

c. The portrayal of the maintenance and heavy equipment supply systems in the BALFOR Model indicates that multiple constraints are operating which reduce the committed force. The CSS support system is a personnel replacement constrained system until D+15 and then changes to a supply issue constrained system caused by the RFI rate from depots. The supply issue constraint lasts until PWRMS is exhausted, at which time the PWRMS level becomes the constraint. The PWRMS constraint lasts until resupply of major items of equipment begins to arrive from CONUS in sufficient amounts to replace losses.

d. A risk assessment was made based upon the sensitivity runs conducted. The magnitude of change from base case input values was compared to the change in committed tanks on FEBA at D+50. This rank orders the degree of risk associated with estimates of input variables (Table 2). The degree of risk associated with loss estimates is highest, followed closely by recovery rates. The risk associated with estimating the recovery and attrition rates in combination is shown in Figure 15. This risk is expressed in terms of the PWRMS level per division per day needed to offset the risk. The PWRMS values in Figure 15 are expressed in rate terms and therefore are also the RFI rates required to support a committed division per day. The risk associated with estimating both attrition rates and recovery rates is high in terms of additional resource required. A 48 percent change in recovery changes the required PWRMS level by 50 percent (Figure 15). A change in attrition rate from 7.2 to 5 percent per day decreases the PWRMS level needed by 50 percent (Figure 15).

Table 2. Risk Assessment Derived from Sensitivity Analyses

Input variable	Change in the input variable (percent)	Effect of input change measured at output (percent)	Coefficient of change for force variable (output/input)
PWRMS level	+100	9.2	.092
RFI rate	-50	8.3	.166
Issue rate	+25	--	--
Loss rate	-50	29.5	.590
Loss rate	+100	24.3	.243
Recovery rate	-48	16.5	.344

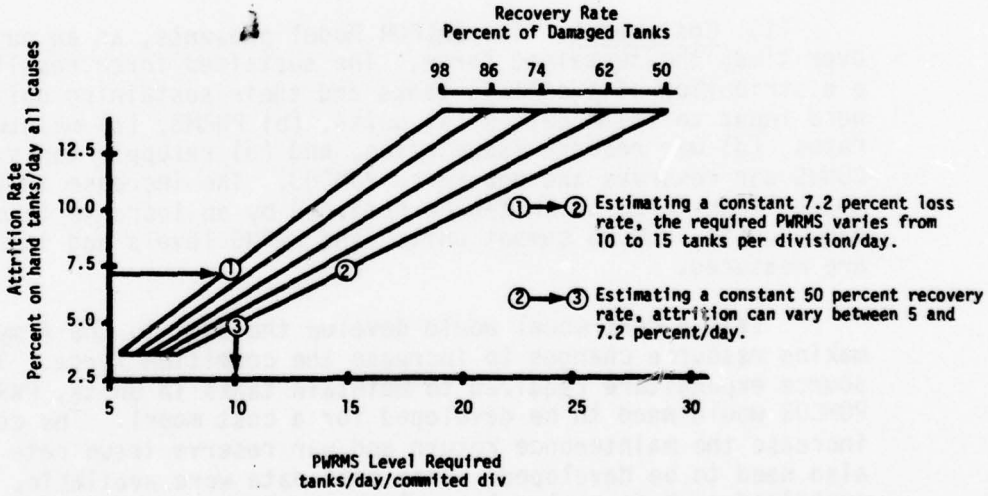

Figure 15. Risk of Estimating Two Force Variables: Attrition Rate and Recovery Rate of Damaged Tanks

12. POTENTIAL USES OF BALFOR

a. Methodology Assessment. The BALFOR Model can be expanded to portray all maneuver units and the combat service support with workloads that are related to manuever units. It fills a needed gap in assessing CSS support and shortfalls. The methodology cannot be applied to command and control functions or to force-wide support functions that are based upon existence or population allocation rules. The advantages of expansion of the BALFOR Model to other workload related support areas are:

(1) Show the sustaining support needed to maximize combat payoff for a given investment in the combat force.

(2) Attack a wide range of equipment distribution questions.

(3) Show impact of sustainability on a committed force and risks associated therewith.

(4) Quantify the risks associated with an imbalance in combat and support forces.

b. Possible Methodology Extensions. Proposed methodology extensions are listed below to inform the reader the type study objectives which can be accomplished with the model. The most promising of these is the addition of a cost submodel to the BALFOR Model. This potential expansion of the methodology is discussed first.

(1) Cost Model. The BALFOR Model presents, as an output over time, the sustained force. The sustained force results from a distribution of available tanks and their sustaining units which were input to the model as (a) units, (b) PWRMS, (c) maintenance rates, (d) war reserve issue rates, and (e) resupply tanks, from CONUS war reserves and uncovered POMCUS. The increase in the committed tank force which can be obtained by an increase in maintenance units, POMCUS combat units, and PWRMS levels and issue rates are measured.

(a) A cost model would develop the cost to the Army of making resource changes to increase the committed force. The resource expenditure required to maintain tanks in units, PWRMS, and POMCUS would need to be developed for a cost model. The cost to increase the maintenance return and war reserve issue rate would also need to be developed. Once cost data were available, the sustained tank force levels would be evaluated for rough, approximate cost.

(b) The current measure of effectiveness in BALFOR is the cumulative tank days on FEBA or the level of the sustained tank force at a specific time. When costs are added to the model the measure of effectiveness would change to the maximum sustained level which can be obtained for a given dollar investment, or a matrix of the cost and the associated levels of sustained tanks. Cost effectiveness of proposed resource allocations could be evaluated. The first step should be to develop only relative cost data in order to avoid the resource commitment required for full cost estimates. Full cost estimates could then be restricted to the alternatives which appear to yield the highest payoff.

(2) Uncovered POMCUS. The model, as written, handles POMCUS uncovered stocks as resupply to the theater and subsequent issue to the committed units. Since the model is a system model which begins the simulation with an M-day distribution of tanks, the processing of uncovered POMCUS equipment can be simulated in the same manner as the processing of PWRMS stocks. In order to accomplish this, the process of preparing a tank for turn-in to DARCOM would have to be modeled. This would determine the workload required in CONUS to prepare the tank for shipment. If uncovered POMCUS is to be issued to reserve units falling in, this option for distributing left-behind tanks would have to be included in the model. To model the processing of uncovered POMCUS at REFORGER and 2+10 stations, available manpower and skills to be available at these CONUS locations would have to be estimated. The BALFOR Model with these changes could then be used to determine the relative effect on the committed tank force of selected plans for handling uncovered POMCUS equipment.

(3) Other Types of Combat Service Support. The model as it is now written addresses maintenance support and the supply support needed to issue major items. Other CSS functions can be evaluated for addition to the model. They are listed below.

(a) Helicopter maintenance support.

(b) Missile maintenance support.

(c) The workload of combat damaged vehicle recovery.

(d) Workload related support of ammunition, POL, and some hospital functions.

(e) Supply of repair parts

(f) Transportation support.

13. CONCLUSIONS/RECOMMENDATIONS

a. Conclusions

(1) CSS impacts on the committed force can be modeled and measured in magnitude and duration.

(2) CSS and combat force changes can be evaluated with one measure of effectiveness.

(3) The committed force at FEBA over a specified time interval can be used successfully as a measure of effectiveness in those force studies which measure the deployment, warfighting, and sustainability of a force.

(4) Sensitivity analysis to establish risk levels can be used within CAA to isolate input variables which are driving study results.

(5) Recovery and attrition levels are key factors in the determination of the PWRMS levels needed to support the force.

b. Recommendations

(1) Combat damage and repair distributions should be derived for weapon systems other than tanks in order for CAA to expand its CSS analysis.

(2) A follow-on study effort to SSIPL should be defined and implemented with the incorporation of cost as its first priority. The priority of adding other CSS functions to the BALFOR should be determined.

(3) The BALFOR Model should be adopted as a standard CAA analytical tool.

APPENDIX A

STUDY CONTRIBUTORS

1. STUDY TEAM

a. Study Director

Mr. Harold D. Frear, Force Concepts and Design Directorate.

b. Team Members

Mr. Marc Abrams

Mr. Erv Gutman

Mr. Paul Fitzpatrick

Mr. Joe Nichols, Methodology, Resources and Computation Directorate

c. Support Personnel

Ms. Phyllis Voldal

Ms. Bobbie Carol Guenthner, Word Processing Center

Ms. Julie Fuller, Word Processing Center

Ms. Joyce Garris, Word Processing Center

Sgt. Norman Price, Graphics Branch

Ms. Judy Bomstein, Graphics Branch

d. Other Contributors

Mr. Howard G. Whitley

LTC Jim Nugent

Mr. Ralph Webb, Joint Forces and Strategy Directorate

e. Product Review Board

Mr. Dan J. Shedlowski, Chairman

LTC James H. M. Malley

LTC Robert L. Stober

APPENDIX B

STUDY DIRECTIVE

MOCA-FDC 14 June 1978

MEMORANDUM FOR: DIRECTOR, FCDD

SUBJECT: Study - Methodology to Determine Support and Sustainability Implications of Increased POMCUS Levels (SSIPL)

1. PURPOSE OF STUDY DIRECTIVE. To establish a study to assess the contribution of support functions on combat force performance for various levels of POMCUS.

2. STUDY TITLE. Methodology to Determine Support and Sustainability Implications of Increased POMCUS Levels (SSIPL).

3. BACKGROUND. The DOD's FY 80-84 Consolidated Guidance directed major increases to POMCUS levels in Europe. These increases will result in an undetermined increase in the workload of support force units. No method currently exists within DA to analyze the impact on force performance that these increased workloads have. This study will develop an automated method to relate these increased support requirements to POMCUS levels.

4. STUDY SPONSOR. Commander, US Army Concepts Analysis Agency.

5. STUDY AGENCY. US Army Concepts Analysis Agency.

6. TERMS OF REFERENCE

a. Problem. To quantify in a common measure of effectiveness the relative contribution to force performance of combat forces, and the supporting and sustaining forces.

b. Purpose. To develop a model and methodology to be used to simulate and analyze the contribution of selected support force functions to the combat force performance at selected levels of POMCUS.

c. Objectives.

(1) To develop and demonstrate a methodology which assesses the force performance implications of a change in the POMCUS issue rates, the maintenance return rates, and the PWRMS issue rates as they affect the committed tank force in CENTAG.

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(2) To conduct analysis to identify areas where changes in resource allocation among support functions will improve force performance.

d. Scope. The study will develop a simulation model that represents the state and time events associated with the committed tank force. Added to the simulation is an optimization module to provide maximization of a set of user-defined decision variables.

e. Constraints. The study will not exceed one year.

f. Time Frame. 1978-85.

g. Assumptions. Assumptions not already implied or specified within references will be provided by the Technical Review Board, CAA.

h. Essential Elements of Analysis.

(1) What is the impact on force performance of an increase in POMCUS site issue rates at the FY 78, FY 82 and FY 84 level of POMCUS?

(2) What is the impact on force performance of an increase in maintenance capability at the FY 78, FY 82, and FY 84 level of POMCUS?

(3) What is the impact on force performance of an increase in PWRMS issue capability at the FY 78, FY 82, and FY 84 level of POMCUS?

(4) What is the sensitivity of the results obtained in (1), (2), and (3) above to changes in the rates of noncombat losses, combat losses and major item abandonment?

i. Environment/Threat Guidance. The Army Force Planning Data and Assumptions (AFPDA) and the CAA Technical Review Board recommendation are applicable.

7. RESPONSIBILITIES.

a. Force Concepts and Design Directorate will provide the Study Director.

b. Methodology, Resource and Computation Directorate.

(1) Administer the one-week GASP IV workshop.

(2) Provide computer support.

(3) Provide technical assistance in the model programing.

MOCA-FDC
SUBJECT: Study - Methodology to Determine Support and Sustainability Implications of Increased POMCUS Levels (SSIPL)

8. LITERATURE SEARCH.

a. DAMO-OD and DAMO-FD have the responsibility for the subject matter of the study.

b. The subject is related and supports the following studies.

(1) Total Army Analysis.

(2) OMNIBUS Capability Study.

9. REFERENCES.

a. AR 5-5, The Army Study System.

b. CSR 71-2, US Army Operational Readiness Analysis.

c. FY 80-84 Consolidated Guidance.

10. ADMINISTRATION.

a. Support Required.

(1) Funds.

(a) TDY funds for two trips Redstone Arsenal, Alabama to CAA for one person (estimated cost $500.00).

(b) Funds for the temporary hire of two GS-9/11 programer-analysts (estimated cost $40,000).

(c) Funds for a one-week GASP IV workshop (estimated cost $4500).

b. Study Schedule.

(1) 1 Jul 78. Start date with two temporary hires GS-9 or 11 on board.

(2) 15 Oct 78. Steady state simulation of CENTAG tank commitment operating.

(3) 15 Nov 78. Maintenance, POMCUS and PWRMS issue queues added.

(4) 15 Dec 78. Technical Review Board to assess feasibility.

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(5) 15 Mar 79. CENTAG simulations completed.

(6) 15 May 79. Theater simulations completed.

(7) 30 Jun 79. Report preparation complete.

c. Control Procedures.

(1) Direct coordination is authorized and encouraged between CAA and DA Staff.

(2) FD will submit DD Form 1498.

(3) CAA, TRB will provide study guidance.

Ennis C Whitehead Jr

ENNIS C. WHITEHEAD, JR.
Major General
Commanding

CF:
DIRECTOR, MRCD
CHIEF, PPCO

APPENDIX C

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5. TOE 29-055 Maint Bn, Abn Div
6. TOE 29-085 Maint Bn, Ambl Div
7. TOE 29-137 Maint Co, He, GS
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9. TOE 29-207 Maint Co, Fwd, DS
10. TOE 29-135 Spt Bn, Sep Ind Bde
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20. Transportation Model (Draft Documentation), to be published

21. POMCUS Objective Levels (POMOL) Study, CAA-SR-79- , to be published

22. Wartime Requirements for Ammunition and Materiel, FY 81-85 (AMMO P-85 WARF-85), CAA-SR-79-1, Feb 79

23. Army Force Planning Data and Assumptions, FY 1978-1985 (AFPDA FY 79-85), CAA-SR-78-6, Oct 78

US Army Logistics Center

24. Maintenance Simulation of Restructured General Support (RGS). Final Report, Jul 78

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APPENDIX D

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(S) OMNIBUS Capability Study FY 79 (U), CAA-SR-79- , to be published

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Kaiserslautern Army Depot

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APPENDIX E

BALFOR MODEL INTEGRATION WITH GASP IV PROGRAMS.

E-1. GENERAL. This appendix describes the logical relationship that exists between GASP IV and BALFOR Models.

a. Paragraph E-2 presents an overall flow diagram along with a listing of all the routines.

b. Paragraph E-3 describes the basic event data block used by the event routines. This paragraph also describes the linkage structure for these blocks in the file.

c. Paragraph E-4 briefly describes the event processing routines in GASP.

d. Paragraph E-4 presents a brief description of the BALFOR event routines.

e. Paragraph E-5 presents an example of how the BALFOR event routines use the GASP IV language.

E-2. FLOW DIAGRAMS AND EXTERNAL REFERENCES. A flow diagram of GASP IV and BALFOR written subroutines is shown in Figure E-1. Utility routines are shown in Figure E-2. Tables E-1 and E-2 show external references in BALFOR routines and GASP routines.

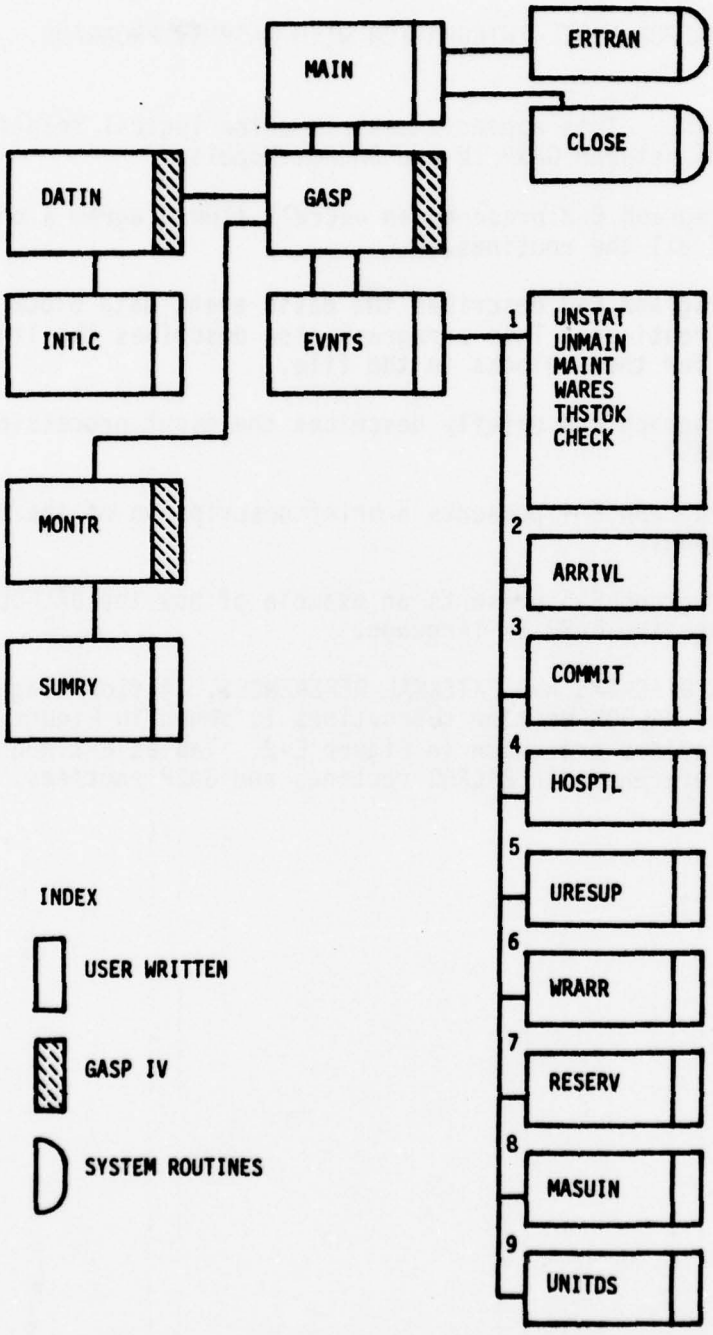

Figure E-1. Flow Diagram of GASP IV, User, and System Routines

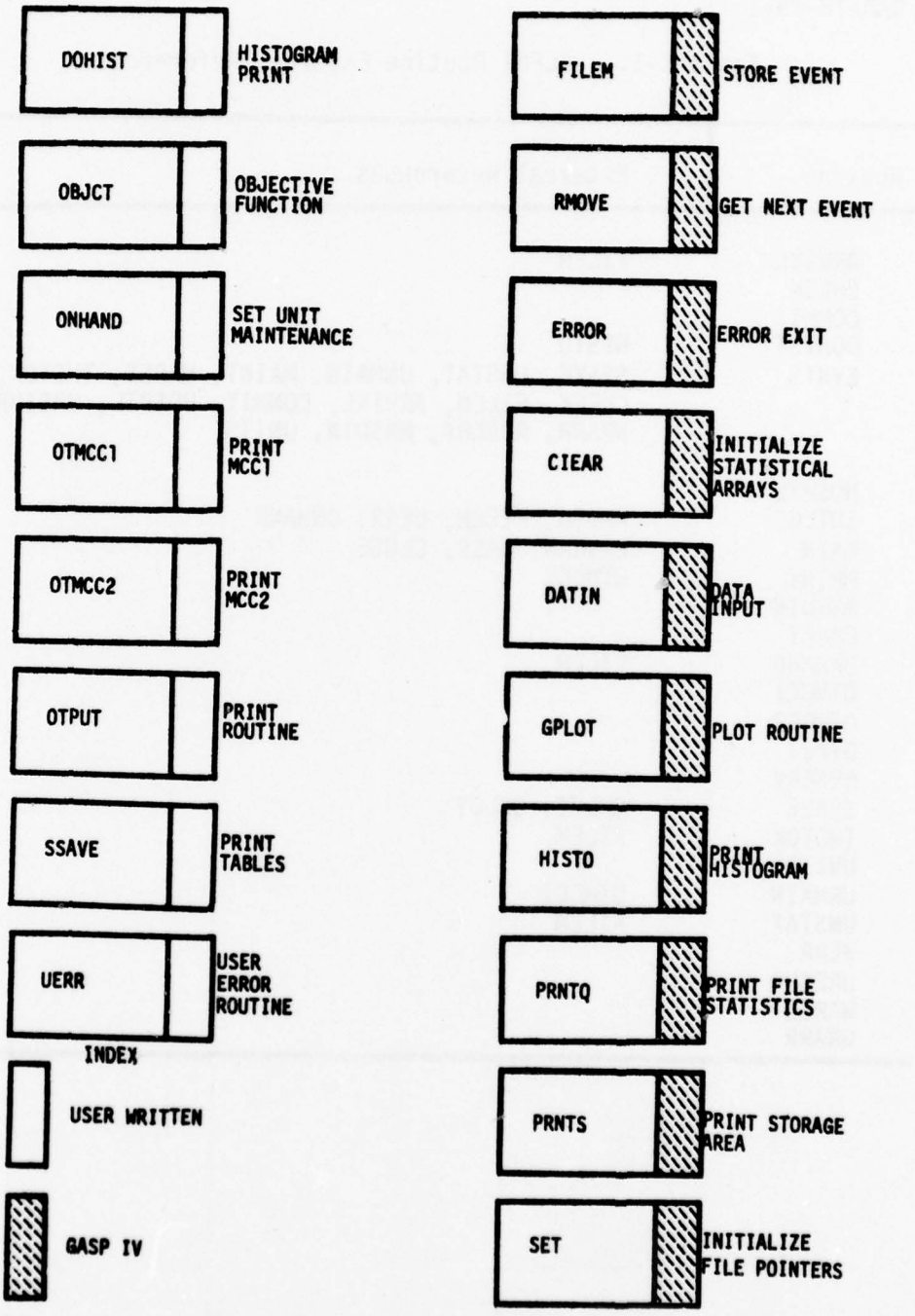

Figure E-2. Utility Routines

Table E-1. BALFOR Routine External References

Routine	External References
ARRIVL	FILEM
CHECK	
COMMIT	
DOHIST	HISTO
EVNTS	SSAVE, UNSTAT, UNMAIN, MAINT, WARES, THSTOK, CHECK, FILEM, ARRIVL, COMMIT, HOSPTL, URESUP, WRARR, RESERV, MASUIN, UNITS
HOSPTL	
INTLC	PRNTQ, FILEM, UERR, ONHAND
MAIN	ERTRAN, GASP, CLOSE
MAINT	OTMCC2
MASUIN	
OBJCT	
ONHAND	FILEM
OTMCC1	
OTMCC2	
OTPUT	
RESERV	
SSAVE	GPLOT, COLCT
THSTOK	FILEM
UNITDS	
UNMAIN	OTMCC1
UNSTAT	FILEM
VERR	
URESUP	
WARES	
WRARR	

Table E-2. GASP Routines External References

Routine	External References
CLEAR	ERROR
COLCT	ERROR
DATIN	ERROR, DRAND, SET, FILEM, CLEAR, INTLC, STATE, PRNTQ, PRNTS
DRAND	
ERROR	UERR, SUMRY, ERTRAN
FILEM	ERROR
GASP	ERROR, DATIN, SSAVE, SCOND, STATE, MONTR, EVNTS, RMOVE, OTPUT, SUMRY
GPLOT	ERROR
HISTO	ERROR
MONTR	ERROR, SSTOP, FILEM, UMONT, PRINTQ, CLEAR, PRNTS, SUMRY
PRNTQ	ERROR
PRNTS	ERROR
RMOVE	ERROR
SCOND	DUMMY ROUTINE
SET	ERROR
STATE	DUMMY ROUTINE
SUMRY	ERROR, COLCT, TIMST, PRNTQ, PRNTS, HISTO, GPLOT
TIMST	ERROR
UMONT	DUMMY ROUTINE
SSTOP	OBJCT

E-3. BASIC EVENT BLOCK AND FILE LINKAGE

a. Basic Event Block. The basic event block is an array of seven words, ATRIB. The array contains the necessary information to execute an event routine. When an event is to be placed in the event store, the time of the event and the number of the event are placed in ATRIB(1) and ATRIB(2). Additional data, ATRIB(4) thru (7) is also placed in ATRIB. A call is placed on subroutine FILEM and the data is placed in the event file in proper time sequence. As indicated on the flow diagram, there are nine time events. The data that must be transferred to the event list is described in the following table for each time event.

Table E-3. Data to be Transfered to the Event List

ATRIB EVENT, CODE	1	2	3	4	5	6	
UNSTAT,1	Time	Event,Code					
ARRIVL, 2	"	"	Unit				
COMMIT, 3	"	"	Unit				
HOSPTL,4	"	"			C		D
URESUP,5	"	"	Unit	A	C		B
WRARR,6	"	"		A			B
RESER,7	"	"			C		D
MASUIN,8	"	"			G	F	B
UNITDS, 9	"	"	Unit	E			

Index for table E-3

A. Amount of equipment

B. Equipment type

C. Number of personnel

D. Personnel type

E. Table Index

F. Option switch

If option switch (F) = 4, increment DS maintenance by ATRIB(5)
= 5, increment GS maintenance by ATRIB(5)
= 6, increment war reserve output ATRIB(5)

b. File Linkage Structure. Each routine that calls FILEM supplies the data indicated in Table E-3. FILEM transfers the data into available storage and adds two pointers, one at the front end of the block and one at the back. The linkage structure is a forward and backward linked list. Available storage is also linked in a similar manner, but has a -1 in place of the backwards pointer. Thus, to add an event into the event list one transfers the data to available storage, determines the position of the block in the event list and updates the pointers.*

*A detailed description of the GASP IV filing system is contained on pp 31-36, the GASP IV Simulation Language.[31]

E-4. EVENT PROCESSING

a. FILEM is the GASP routine that handles the storing of event data. Each call on FILEM results in a block of data being transferred to the event list and placed in proper time sequence. A description of the data and how the data is placed in proper time sequence is described in reference 31.

b. RMOVE is the GASP routine that places the first block of data in the event list into ATRIB. It returns the block to available storage and returns control to GASP.

c. EVNTS is a user written routine which transfers control to the proper event routine. GASP calls RMOVE to place the next event data into ATRIB. Next GASP calls EVNTS to execute the routine associated with the data. After executing the event routine, EVNTS returns control to GASP.

d. GASP is the routine that controls the execution of the time events.

e. DATIN is the GASP routine which initializes the GASP arrays and inputs the GASP data.

f. The GASP routines which play a utility role are briefly described. Some of these routines are called but are not used. A complete description of these routines may be found in the GASP IV Simulation Language.[31]

(1) DRAND — A psuedo random number generator (not used).

(2) COLCT — Computes the mean standard deviation, standard deviation of the mean, coefficient of variation, minimum value, maximum value, and number of observations.

(3) GPLOT — The GASP plot routine

(4) PRNTQ — Prints the event file storage area.

(5) PRNTS — Not used

(6) HISTO Print histograms

(7) CLEAR Initialize the storage arrays SSOBV and SSTPV, the statistical arrays used by COLCT and TIMST.

(8) MONTR The subroutine MONTR is a debugging routine. This routine, which may be very useful in the debbugging of a program, is not necessary to the logical relationship between GASP IV and the user program. If subroutine MONTR is called, then the following options are available. Let JEVNT be the event code and JX=-JEVNT.

(a) JEVNT≥0, PRINT TNOW, (ATRIB(I), I=1,7)
PRINT TTNEX, (QSET(I), I=1,7)
or PRINT TTFIN if TTNEX does not exist.

(b) JEVNT<0

1 JX≥6, call error and return

JX=2, clear storage arrays and return

2 ATRIB(3) ≤0 and

JX=1, call PRNTQ and return

JX=3, call PRNTS and return

JX=4, call PRNTQ, PRNTS and return

JX=5, call SUMRY and return

3 ATRIB(3)>0

Plant the event
ATRIB(1)=TNOW+ATRIB(3)
ATRIB(2)=JEVNT
CALL FILEM(1)

and then proceed as in part B.

(9) SET Initialize the event file storage area.

(10) STATE Dummy routine

(11) SUMRY — A summary print routine to:
a. Print statistics collected by COLCT
b. Print statistics collected by TIMST
c. Print event file statistics
d. Print state storage area
e. Print histograms
f. Print tables and plots

(12) SCOND — Dummy routine

(13) TIMST — Computes the mean, standard deviation, minimum, maximum, time interval, and current value.

(14) UMONT — Sets the input parameter to zero.

(15) ERROR — GASP error exit.

E-5. BALFOR EVENT ROUTINES. The event routines are nine in number and each routine will be given a more complete description in Appendix G.

1. Event number 1 consists of six routines: UNSTAT, UNMAIN, MAINT, WARES, THSTOCK and CHECK:

UNSTAT — Computes the noncombat and combat losses for each unit

UNMAIN — Computes the unit maintenance which is associated with each combat unit.

MAINT — Computes the rear maintenance which is associated with each type of equipment.

WARES — Determines the war reserve output rate for each type of equipment.

THSTOK — Supplies units with new equipment and personnel.

CHECK — A summary print table.

2. ARRIVL — Sets the units onhand equipment level and schedules the commitment of the unit.

3. COMMIT — Sets the status of the unit: THTRSM(N,1)=2.

4. HOSPTL — Returns hospital personnel to theater stocks.

5. URESUP — Receives unit supplies from theater stocks.

6. WRARR — Determines the increase in war reserve stocks of equipment.

7. RESERV — Receives reserve personnel into theater stocks.

8. MASUIN — Increases the maintenance or supply capacity.

9. UNITDS — Sets the maintenance capacity of a unit.

a. User Utility Routines. The user routines which act in a utility role are briefly described. These routines are generally concerned with input and output; however, a few are computational in nature. A complete description of these routines may be found in Appendix G.

(1) DOHIST — Computes the total number of vehicles of all types in the unit maintenance queue; the total number of vehicles of all types in the area DS maintenance queue. The total number of vehicles of all types in the rear GS maintenance queue. DOHIST then calls the GASP histogram routine, HISTO.

(2) INTLC — The user data input routine, INTLC, also initializes the BALFOR summary arrays.

(3) OBJECT — Dummy routine

(4) OTMCC1 — A diagnostic print routine.

(5) OTMCC2 — A diagnostic print routine.

(6) OTPUT — The BALFOR summary print routine.

(7) ONHAND — Sets the onhand equipment level and personnel level of a unit. Also computes the maintenance capacity of a unit.

(8) SSAVE — Prints the tables and plots.

(9) UERR — A user error routine.

E-6. EXAMPLE. The following example explains the basic logical relationship of GASP IV with the BALFOR time events. The example is self-explanatory; however, one should note the following items:

a. For reasons of clarity, the common blocks have not been included.

b. Calling sequences have been truncated, if not essential to the logical flow.

c. One could describe the example as a computational procedure which is time sequenced.

d. FILEM should not be called with times which are meaningless, since FILEM does not check for erroneous times.

e. The events counter, NBEVTS, is the total number of events in the file; FILEM increments the counter and RMOVE decrements the counter. (GASP IV does not work exactly this way but for reasons of clarity this method has been used).

```
      Program Main

C     Example to illustrate the use of GASP IV
C     with BALFOR time events
C
C
      Call GASP
      Print 1
    1 Format (1x, 'End of Run')
      End
C
C
      SUBROUTINE GASP
C     Initialize GASP and input GASP data cards
C     Initialize program and input data cards
      Call DATIN
      Call INTLC
C
C
C     Test for NB of events remaining
    1 IF (NBEVTS) 3, 4, 2
C
C
C     Place next time event into ATRIB and EXECUTE
    2 Call RMOVE (1)
      IF (ATRIB(1) .gt. KDAY) return
```

```
                Call EVNTS
      C         go to 1
      C
      C
      C         EVENT counter is negative, signal an error
                Call ERROR
                Return
      C
      C
      C         Number of events is zero, end of run
            4   Return
                End
                SUBROUTINES EVNTS

      C         Transfer control to proper event routine.
      C
                Ix=ATRIB(2)
                go to (1,2,3,4,5,6,7,8,9), IX
      C
      C
      C         Compute noncombat and combat equip losses, maintenance
      C         Requirements, war reserve, supplies, and print check table.
            1   Call UNSTAT
                Call UNMAIN
                call MAINT
                call MAINT
                call THSTOK
                call CHECK
      C         Test for end of computations
                IF(TNOW. ge. KDAY) Return
      C         Plant an EVENT of Type 1 for next day.
                ATRIB(1)=TNOW+1
                ATRIB(2)=1
                CALL FILEM(1)
                Return
      C
      C
      C         Set unit equipment level, arrival status
            2   Call ARRIVL
                Return
      C
      C
      C         Commit unit to combat
            3   Call COMMIT
                Return
      C
      C
      C         Return hospitalized personnel to theater stocks
```

```
      4  Call HOSPTL
         Return
C
C
C        Unit supplies are received from theater stocks.
      5  Call URESUP
         Return
C
C
C        Increase war reserve STOCKS
      6  Call WRARR
         Return
C
C
C        Reserve Personnel Enter Theater Stocks
      7  Call RESERV
         Return
C
C
C        Increase Maintenance Capacity or supply capacity.
      8  Call MASUIN
         Return
C
C
C        Set the maintenance capacity of a unit.
      9  Call UNITDS
         Return

         End
```

APPENDIX F

A USER AND PROGRAMMER

GUIDE

TO EXECUTE THE BALFOR SIMULATION

BY: MARC ABRAMS
DATE: 22 MARCH 1979
DOCUMENT VERSION: VERSION 4
MASTERFILE VERSION: LEVEL-9R17.2.79
SITE: U.S. ARMY CONCEPTS ANALYSIS AGENCY
PHONE: 295-1589

CAUTION: THIS DOCUMENT HAS BEEN CHECKED FOR ACCURACY, ALTHOUGH AS IN ANY SOFTWARE DOCUMENTATION, THE DESCRIPTION MAY NOT BE 100% ACCURATE!

TABLE OF CONTENTS

1. INTRODUTION

1.1. PURPOSE OF MANUAL

THIS MANUAL DOCUMENTS A UTILITY PROGRAM, MASTERFILE, WHICH EXECUTES THE BALFOR MODEL AND MAINTAINS ITS PROGRAM FILES.

ADDITIONAL COPIES OF THIS DOCUMENT MAY BE OBTAINED BY TYPING

@DOC.DL @ZDOC.MASTERFILE

1.2. BRIEF DESCRIPTION OF CONTENTS

CHAPTER 2 IS A USER'S GUIDE TO THE MASTFFILE PROCESSOR. IT DETAILS HOW TO EXECUTE THE BALFOR MODEL AND TO MAINTAIN THE PROGRAM FILES.

THE NEXT CHAPTER IS A PROGRAMMER'S GUIDE TO THE MODEL. OUTLINES OF THE FORTRAN IV CODING IN EACH SUBPROGRAM DESCRIBE THE MASTERFILE PROGRAM. THE CHAPTFR ENDS WITH A LIST OF THE BASE CASE INPUT DATA.

1.3. REFERENCES

ADDITIONAL INFORMATION ON GASP IV AND THE BALFOR MODEL CAN BE FOUND IN THE FOLLOWING SOURCES:

1. LEVEL 1-9 BALANCED FORCE (BALFOR) DOCUMENTATION
2. SOURCE CODES OF LEVEL-8, 9, AND 10 GASP IV USER PROGRAMS
3. AUTHOR'S NOTES
4. A. ALAN B. PRITSKER, "THE GASP IV SIMULATION LANGUAGE"
5. MICHAEL PATRICK GATELY, "DECISION OPTIMIZATION MODULE FOR THE GASP IV SIMULATION LANGUAGE"

2. USER'S GUIDE

2.1. OVERVIEW

2.1.1. HISTORY: THE PROBLEM

THERE ARE THREE JOBS INVOLVED IN PROGRAMMING A SIMULATION: WRITING AND DEBUGING THE CODING, MAINTAINING PROGRAM AND DATA FILES, AND EXECUTING THE MODEL. THIS SECTION TREATS THE LAST TWO STEPS.

MAINTAINING FILES IS A CONFUSING PROCESS BECAUSE EACH MEMBER OF THE STUDY GROUP MUST RELY ON FILE AND ELEMENT NAMES TO FIND PROGRAM VERSIONS, DATA FILES, AND RUNSTREAMS IN A MYRIAD OF FILES. USUALLY THE NAMES ARE AMBIGUOUS BECAUSE MORE THAN ONE VERSION OF A BIVEN ELEMENT EXISTS AS IT IS DEVELOPED. THE SHORT LIFE OF THESE DEVELOPMENTAL ELEMENTS AND THE RATE AT WHICH THEY ARE UPDATED PRECLUDES DOCUMENTING THEM.

2.1.2. MASTERFILE: THE SOLUTION

TO ALLEVIATE THIS STUMBLING BLOCK THE MASTERFILE PROCESSOR WAS CREATED.

WITH RESPECT TO FILE MAINTENANCE THIS UTILITY PROVIDES TWO FUNCTIONS. FIRST IT KEEPS TRACK OF THE LATEST VERSIONS OF DEVELOPMENT PROGRAMS, THEREBY ELIMINATING THE NEED FOR MORE THAN ONE VERSION OF ANY PROGRAM. SECOND IT AUTOMATICALLY DOCUMENTS DATA ELEMENTS AND ABSOLUTE PROGRAMS. IN CONJUNCTION WITH ITS DOCUMENTING FUNCTION MASTERFILE KEEPS A RECORD OF WHAT SOURCE PROGRAMS WERE USED TO CREATE ALL ABSOLUTE PROGRAMS AND MOVES THESE PROGRAMS OUT OF THE USER'S DEVELOPMENTAL FILE INTO A SPECIAL LIBRARY.

THE MECHANICS OF THESE FUNCTIONS ARE COMPLETELY TRANSPARENT TO THE USER AND ARE DESCRIBED IN DETAIL IN THE NEXT CHAPTER.

FROM A USER STANDPOINT THE MASTERFILE PROGRAM IS A CONVERSATIONAL PROGRAM, ASKING THE USER FOR A MINIMAL AMOUNT OF DATA TO COMPILE AND EXECUTE AN ABSOLUTE ELEMENT. THE INTERACTIVE NATURE OF MASTER FILE DOES NOT PRECLUDE ITS BEING USED IN A BATCH ENVIORNMENT.

EXECUTING THE ABSOLUTE, THE THIRD JOB OF A PROGRAMMER AND THE THE USER, IS A TIME CONSUMING PROCESS BECAUSE WHENEVER A DATA ELEMENT IS UPDATED ALL RUNSTREAMS USED TO EXECUTE THE MODEL BECOME OBSOLETE.

IDEALLY, A USER WOULD ONLY NEED TO TYPE "RUN ABSPROG" OR "XQT ABSPROG" TO QUICKLY EXECUTE A PROGRAM. WHAT COMPLICATES THIS PROCESS IS THAT THE USER MUST ENTER EXEC 8 CONTROL STATEMENTS BEFORE THE @XQT STATEMENT TO TAYLOR THE OPERATING ENVIORNMENT TO THE ENVIORNMENT NEEDED BY A PROGRAM. THIS PREPARATION MAY INCLUDE ASSIGNING FORTRAN DATA FILES, ASSIGNING SYMBIONT FILES, AND MAKING DATA FILES AVAILABLE TO THE PROGRAM.

BUT SINCE THIS ENVIORNMENT IS VIRTUALLY THE SAME EACH TIME THE MODEL IS EXECUTED, THE MASTERFILE PROGRAM, IN ADDITION TO MAINTAINING DATA FILES, CREATES THIS ENVIORNMENT. THUS THE MODEL IS NOT RUN DIRE UNDER THE CONTROL OF EXEC 8, BUT INDIRECTLY THROUGHT THE MASTERFILE PROCESSOR.

THE DESIGN OF MASTERFILE WAS NOT ESSENTIAL TO DEVELOPING THE MODEL. THE DECISION TO DEVOTE TIME TO ITS DEVELOPMENT CAME FROM THE PERCEPTION THAT AS THE SIZE AND COMPLEXITY OF THE MODEL GREW THE SIZE OF PROGRAM FILES AND COMPLEXITY OF EXECUTION WILL ALSO GROW.

2.2. HOW TO USE MASTERFILE

GIVING STEP BY STEP INSTRUCTIONS ON USING THE MASTERFILE PROGRAM, THIS SECTION CONTAINS THE BULK OF THE USER'S GUIDE.

2.2.1. THE FIRST STEP: @ADD

THE FIRST STEP A USER SHOULD PERFORM AFTER SIGNING A TERMINAL ON IS TO TYPE

```
@ADD @ADD.
```

@ADD. IS A CANNED RUNSTREAM WHICH PERFORMS TWO FUNCTIONS. FIRST IT COPIES THE MASTERFILE, SUSPEND, AND

RESUME PROGRAMS INTO THE USER'S WORKSPACE. SECOND IT ALLEVIATES THE NEED FOR THE USE TO REMEMBER FILENAMES LIKE "92RUNS" BY ATTACHING 1 OR 2 CHARACTER ABBREVIATIONS TO THEM. A LIST OF ABBREVIATIONS APPEARS IN TABLE 2-1.

THE ACTUAL JCL IS LISTED IN APPENDIX B, SECTION 5. A DESCRIPTION OF THE CONTENTS OF EACH FILE LISTED IN TABLE 2-1 IS INCLUDES IN APPENDIX A, SECTION 4.

TABLE 2-1. BUSE ATTACHED MNEMONICS FOR COMMON GASP FILES

MNEMONIC	CORRESPONDING FILENAMES (1)
D	82DOC.
G	82GASP.
I	82IO.
M	82MASTERFILE. (2)
R	82RUNS.
RD	92MASTERSRD. (2)
U	82UPDATE.
X	82XOT.
$	68UOM.

NOTES:
(1) A DESCRIPTION OF THE CONTENTS OF FILES APPEARS IN APPENDIX A (CHAPTER 8).
(2) THESE ARE THE ONLY FILES WHICH DO NOT RESIDE ON REMOVABLE DISK PACK 36.

OF WHAT VALUE ARE THESE MNEMONICS? A LIST OF ELEMENTS IN A PROGRAM FILE, FOR EXAMPLE, COULD BE OBTAINED BY ENTERING

```
        @PRT,T @2B4SP.
```

OR

```
        @PRT,T @.
```

THE VALUE OF THESE ABBREVIATIONS MAY NOT SEEM TO BE GREAT, BUT TO A PROGRAMMER WHO REFERENCES THE SAME FILES AT THE TERMINAL MANY TIMES A DAY THEY ARE.

IF ONE FORGETS A MNEMONIC OR A FILENAME HE MAY OBTAIN IT SIMPLY BY TYPING

```
        @PRT,I
```

THE BEGINNING OF THE RESPONSE IS A LIST OF THE FILES IN TABLE 2-1. A TYPICAL ENTRY IS:

```
        UNCLASSIFIED,@4SP(1),F14,A,P, NAME ITEM, 6
        ,              ,       ,   ,          ,   ,
        QUALIFIER      ,       ,   ,          ,   ,
           FILENAME AND CYCLE ,   ,          ,   ,
                DISK DRIVE MODEL  ,          ,   ,
                          @ASG OPTIONS       ,   ,
                   NAME ITEM-->FILE IS NOT @ASG'D  ,
                   ASG------->FILE IS @ASG'D       ,
                                          FILE MNEMONIC
```

REFERENCE: TYPE

```
        @GUIDE PRT
```

FINALLY THE USER NOW HAS FOUR ADDITIONAL CONTROL STATEMENTS AVAILABLE TO HIM. THESE ARE LISTED IN TABLE 2-3.

TABLE 2-2. ADDITIONAL EXEC 8 CONTROL STATEMENTS

CONTROL STATEMENT	DESCRIPTION
@MASTERFILE	SEE SECTION 2.2.2
@SUSPEND	DIRECT OUTPUT TO HIGH SPEED PRINTER. SEE SECTION 2.2.3.
@RESUME	SIMILAR TO @SUSPEND
@EDIT	UNIVERSITY OF MARYLAND'S VERSION OF @ED,

2.2.2. THE SECOND STEP: MASTERFILE

IN ORDER TO BECOME FAMILAR WITH THE USE OF MASTERFILE, READ THROUGH THE FOLLOWING SECTIONS.
TO INVOKE MASTERFILE, TYPE

@MASTERFILE[,OPTIONS]

WHERE THE AVAILABLE OPTIONS ARE LISTED IN TABLE 2-3.
THE FILE SHOULD SIGNON WITH:

UNCLASSIFIED*MASTERFILE.MASTERFILE LEVEL-9R17.2.79-TIME-DATE

WHERE THE TIME AND DATE ARE SIX DIGIT NUMBERS.
IF THE RESPONSE IS NOT A SIGNON LINE, BUT:

PROGRAM NOT FOUND

OR

FILE ERROR

THEN THE WORKSPACE HAS BEEN ERASED OR THE USER FAILED TO ADD B2ADD. (SEE SECTION 2.2.1). THIS CAN BE REMEDIED BY TYPING:

```
ENTER
 )ADD B2ADD.
 )MASTERFILE.OPTIONS]
```

THE OPTIONS PRESENTED BELOW WILL NOT WORK WITH VERSION 17.2.79 OF MASTERFILE. ALTHOUGH A LIST OF OPTIONS IS INCLUDED BELOW. BY READING TABLE 2-2 THE USER WILL GET A GRASP OF THE POWER AVAILABLE THROUGH MASTERFILE.

THESE OPTIONS ARE CURRENLY BEING INSTALLED IN THE NEXT RELEASE OF MASTERFILE. THEY WILL FACILITATE BATCH RUNS. WHEN A CONVERSATIONAL PROGRAM IS UNNECESSARY.

TABLE 2-3. OPTIONS ON @MASTERFILE CONTROL STATEMENT

OPTION	SPECIFICATION
A	DO NOT @ADD OR @START THE RUNSTREAM CREATED BY MASTERFILE DYNAMICALLY. INSTEAD PRINT THE FILE NAME FOR FUTURE USE (THE A OPTION IS IGNORED IF THE X OPTION IS SPECIFIED.).
B	NOT USED.
C	NOT USED.
D	DELETE AN OLD ABSOLUTE PROGRAM AND THE SOURCE PROGRAMS FROM WHICH THE ABSOLUTE WAS CREATED.
E	EDIT THE @BRKPT FILE. (3)
F	RECOMPILE ALL PROGRAMS IN A USER SPECIFIED FILE AND STORE THE SOURCE AND OBJECT PROGRAMS IN FILE @2UPDATEVIA @69UOM.FLIST .
G	NOT USED.
H	HOLD THE @BRKPT FILE. (3)
I	NOT USED.
J	NOT USED.
K	NOT USED.
L	NOT USED.
M	PRINT A MAP OF AN ABSOLUTE. THE OUTPUT IS THE FILENAME.ELEMENT-NAME OF ALL PROGRAMS WHICH THE ABSOLUTE ELEMENT WAS @MAP'D FROM.
N	NOT USED.
O	PRINT OPTIONS (EQUAL TO SPECIFYING NO OPTIONS)
P	NOT USED.
Q	NOT USED.
R	RECOMPILE THE PROGRAMS THE USER NOW SPECIFIES.

S @SYM THE BRKPT FILE. MASTERFILE WILL QUERY THE USER AS TO THE DESIRED PRINTER.

T PRINT A TABLE OF CONTENTS FOR ALL USER FILES.

U NOT USED.

V NOT USED.

W NOT USED.

X @XQT THE MODEL.

Y NOT USED.

Z NOT USED (RESERVED FOR DIAGNOSTIC PURPOSES).

NOTES:

(1) UNUSED SPECIFICATION FIELDS ARE RESERVED FOR FUTURE EXPANSION AND SHOULD NOT BE USED.

(2) THESE OPTIONS ARE IGNORED IN VERSION 17.2.79 OF MASTERFILE.

(3) THESE OPTIONS APPLY TO THE @SUSPEND STATEMENT CALLED AFTER PROGRAM EXECUTION (SEE 2.2.3).

IF THE O OPTION IS USED, OR IF NO OPTIONS ARE USED, THE OPTION SPECIFICATIONS WILL BE PRINTED IN A CONVERSATIONAL MODE FOR THE USER. IN OTHER WORDS, THE OPTIONS ARE PROVIDED ONLY SO THAT A USER MAY BYPASS SECTIONS OF THE CONVERSATIONAL CODE. THIS IS ESPECIALLY USEFUL IN A BATCH RUN.

2.2.2.1. EXECUTING THE MODEL

IN THE IDEAL STUATION DESCRIBED IN SECTION 2.1.2, ONE ONLY HAD TO TYPE "@XQT ABSPROG" TO RUN THE MODEL. THIS SITUATION IS ACHIEVED WITH MASTERFILE. NO RUNSTREAM IS EVER NEEDED TO EXECUTE THE MODEL.

BEFORE RUNNING MASTERFILE, SET UP AN INPUT DECK IN SOME FILE OF YOUR CHOICE. THERE IS NO NEED TO

- KNOW THE NAME OF ANY ABSOLUTE ELEMENT,
- KNOW THE NAE OF DATIN-DATA DECKS,
- OR KNOW ANY EXEC VIII CONTROL LANGUAGE

TO RUN THE MODEL—MASTERFILE TELLS YOU WHAT IS AVAILABLE!

ASSUMING THAT YOU HAVE SET UP AN INPUT DECK WITH THE NAME B2I8.RUNSEC (SEE TABLE 2-4 FOR INPUT DECKS ALREADY IN THE COMPUTER), JUST FOLLOW THE STEPS OUTLINED IN THE NEXT FEW PAGES TO EXECUTE THE MODEL USING B2I8.RUNSEC.

CONSQUENTLY TO EXECUTE THE MODEL TYPE

```
@MASTERFILE
```

THE RESPONSE IS

```
UNCLASSIFIED,82MASTERFILE,MASTERFILE LEVEL-9R17.2.79-140854-011579
```

MASTERFILE IS NOW IN A CONVERSATIONAL MODE. ANY DATA IT NEEDS TO CREATE A RUNSTREAM WHICH WAS NOT SPCIFIED ON THE @MASTERFILE STATEMENT WILL BE SOLICITED FROM THE USER.

THE FIRST QUERY IS:

```
ENTER 0 IF THIS IS TO BE A BATCH (OR START) JOB OR 1 FOR A
DEMAND JOB.


DEMAND  JOBS WILL BE EXECUTED AFTER MASTERFILE HAS CREATED A
RUNSTREAM, WHILE IN CONTRAST BATCH JOBS WILL BE @START'D.
     NEXT  MASTERFILE  REQUESTS  THE  FUNCTION OF THE USER'S
RUNSTREAM IF THIS WAS NOT SPECIFIED  BY  AN  OPTION  ON  THE
@MASTERFILE STATEMENT.


 WHICH FUNCTION DO YOU WISH(TYPE 7 FOR A LIST)?




 CHOOSE ONE OF THE FOLLOWING FUNCTIONS:
 1    CREATE A NEW RUNSTREAM TO EXECUTE THE POMCUS MODEL.
 2    CREATE A NEW ABSOLUTE BY RECOMPILING ALL PROGRAMS IN YOUR  RED  FILE.
 3    CREATE A NEW ABSOLUTE BY COMPILING ONLY THE PROGRAMS YOU SPECIFY NOW.
 4    PRINT A MAP OF AN ABSOLUTE PROGRAM.
 5    PRINT A TABLE OF CONTENTS (TOC) FOR ALL GASP FILES.
 6    DELETE AN ABSOLUTE PROGRAM AND SOURCE PROGRAMS UNIQUE TO THAT ELEMENT.

 WHICH FUNCTION DO YOU WISH?


RESPOND BY ENTERING:

>1

IF  YOU ENTER AN INVALID FUNCTION NUMBER, FOR EXAMPLE 9, THE
RESPONSE WILL BE:


 9 IS A BAD CHOICE--TRY 1,2,3,4,5, OR 6!
 YOUR CHOICE?


NOW YOU MAY ENTER A VALID FUNCTION CODE:
```

```
>1
```

AFTER YOUR RESPONSE MASTERFILE REQUESTS A TITLE WHICH WILL BE USED ON THE @HDG CARD IN THE RUNSTREAM:

```
WHAT IS THE TITLE OF THIS RUN (<66 CHARACTERS)?
                                                    <--66
```

THE ARROW AND NUMBER 66 ON THE RIGHT HAND SIDE OF THE PAGE SHOWS THAT THE LENGTH OF YOUR TITLE IS LIMITED TO 66 CHARACTERS. SHOWN BY THE POINT OF THE ARROW. THIS NOTATION IS USED IN OTHER QUERIES, TOO.

A BASIC UNDERSTANDING OF WHAT MASTERFILE IS DOING WHILE THE USER IS BANGING AWAY AT THE KEYBOARD WILL MAKE THE REMAINING EXPLANATION CLEARER.

MASTERFILE EXECUTES IN TWO STEPS:

1. DURING EXECUTION TIME A RUNSTREAM IS CREATED.
2. THE RUNSTREAM IS THEN EXECUTED. THIS PROCESS IS LABELED "DYNAMIC @ADD'ING" OF THE RUNSTREAM (SEE THE A OPTION IN TABEL 2).

THE END OF STEP ONE AND BEGINNING OF STEP TWO IS MORE OR LESS TRANSPARENT TO THE USER, ALTHOUGH THE PROCESSOR ASKS THE USER IF HE WANTS TO @ADD THE STREAM OR @START THE STREAM IMMEDIATELY IN FUNCTIONS 2 AND 3.

THROUGH THIS DISCUSSION IT HAS PROBABLY BECOME APPARENT THAT THERE IS A DISTICTION BETWEEN DEMAND JOBS AND START JOBS. IN START JOBS, STEP TWO IS SUBMITTED TO THE EXEC AS A BATCH JOB AND IS PUT IN BACKLOG. IN A DEMAND JOB STEP 2 IS EXECUTED WHILE THE USER WAITS. CONSEQUENTLY MASTERFILE INSERTS A SET OF @BRKPT (ACTUALLY @SUSPEND/@RESUME, SEE SECTION 2.2.3) STATEMENTS TO START AND FINISH THE RUNSTREAM.

THE FUNCTIONS, THEN, ARE NOT PERFORMED AS THE USER ENTERS THEM BUT ARE EXECUTED IN A SECOND STEP.

2.2.2.2. EXECUTING THE MODEL

THIS SECTION APPLIES IF THE USER WANTS TO CREATE A RUNSTREAM TO EXECUTE THE MODEL. THE PROGRAM ASKS THE USER FOR THE NAME OF A DATA FILE WHICH CONTAINS INPUT FOR THE USER WRITTEN GASP IV SUBPROGRAM INTLC. SECTION 3.4 CONTAINS A COMPLETE SAMPLE INPUT DECK OF THE BASE CASE DATA, WHICH IS USED TO VERIFY EACH LEVEL OF THE MODEL. REFER TO TABLE 2-4

FOR THE LOCATION OF THE INTLC-DATA FILES.

TABLE 2-4. LOCATION OF INTLC-DATA ELEMENTS

FILENAME	ELEMENT NAME	DESCRIPTION
82XQT .	RUNSEC/PROD	BASE CASE DATA FOR LEVEL-8
82IG .	RUNSEC/BASE	BASE CASE DATA FOR LEVEL-9

THUS THE PROCESSOR QUERIES:

```
 WHAT IS THE NAME OF YOUR INTLC FILE (FILENAME.ELTNAME/VERSION)?
>82IG.RUNSEC
 BED.D 82IG.RUNSEC
 IS THIS CORRECT? (Y OR N)?
>Y
```

THE "82IG.RUNSEC" WAS A USER ENTRY.
MASTERFILE THEN REQUESTS THE NAME OF AN ABSOLUTE PROGRAM. AT THIS POINT THE AUTOMATIC DOCUMENTATION FEATURE OF MASTERFILE ASSISTS THE USER IN IDENTIFYING THE CONTENTS OF A FILE BY PRINTING THE ABOLUTE PROGRAM NAMES AND A ONE LINE DESCRIPTION:

```
 CHOOSE ONE OF THE FOLLOWING ABSOLUTE ELEMENTS TO EXECUTE BY NUMBER:

  1  82XQT.ABS/PROD  .  THE PRODUCTION ARSOLUTE
  2  82LEVEL-9.ABS   .  LEVEL-9 ABSOLUTE
  3  82UPDATE.ABS    .  LEVEL-10, WITH PWRMS DTVERSION INTO
MAINTAINENCE
  4  82UPDATE.ABSMOD .  TEST MODULE FOR VARIABLE COMRAT
 YOUR CHOICE?
```

```
    NEXT THE USER CHOOSES A FILE WHICH CONTAINS DATA FOR THE
GASP IV SUBROUTINE DATIN.


CHOOSE A DATIN DATA FILE BY NUMBER.

  1  82XQT.DATIN-DATA  . ONE RUN--NO OPTIMIZATION
  2  82MA.DATIN-OPT    . NNRNS = 5--RUNS THE OPTMIZATION
  3  82MA.DATIN-TEST   . TTFIN=20 --STOP AFTER 20 DAYS FOR
TESTING MODEL.
 YOUR CHOICE?


    A CORE DUMP CAN BE OBTAINED BY REPLYING WITH "Y" TO:


DO YOU WANT A DUMP AFTER EXECUTION OR ONLY ON ERROR (Y OR
N)?
 Y

 CHOOSE ANY OF THESE OPTIONS:
          E  DUMP ONLY ON ERROR
          F  FIELDATA ALPHANUMERIC FORMAT FOR DUMP
          G  FORTRAN "G" FORMAT FOR DUMP
          P  DUMP RUN'S PCT
          C  DUMP ONLY WORDS WHICH HAVE CHANGED DURING EXECUTION
 ENTER OPTIONS, SUCH AS            EFG                 ????


JUST AS A NOTE THE G FORMAT DUMP WILL PROPERLY CONVERT
FLOATING POINT NUMBERS TO BASE 10, BUT INTEGERS WILL NOT BE
CONVERTED TO BASE 10, ALTHOUGH THEY WILL BE PRINTED AS
THOUGH THEY WERE IN BASE 10. THE C OPTION IS ESPECIALLY
USEFUL SINCE ONLY CORE LOCATIONS USED IN THE SIMULATION AND
CHANGED DURING EXECUTION WILL BE PRINTED. THIS MAKES
LOCATING VARIABLE QUICKER. FOR MORE INFORMATION, TYPE

        GUIDE PMD

    AT THIS VERY INSTANT, THE MODEL WILL BE EXECUTING! NO
FURTHER INTERVENTION IS NEEDED. EXECUTION TAKES 1-4
MINUTES, DEPENDING ON HOW BUSY THE SYSTEM IS.
    AT THIS POINT MASTERFILE HAS CREATED A RUNSTREAM AND
PLACED IT IN THE TEMPORARY FILE "RUNSTREAM888." MASTERFILE
THEN USES THE EDITOR TO MANIPULATE THIS ELEMENT, ALTHOUGH
THIS STEP IS TRANSPARENT TO THE USER. NEXT MASTERFILE WILL
```

@ADD,L RUNSTREAMSSS. AGAIN THIS FUNCTION IS TRANSPARENT TO THE USER. THE LEVEL-8 MODEL TAKES ABOUT 1 MINUTE TO EXECUTE, AND LEVEL-9 ABOUT TWICE AS LONG. IF THE DIAGNOSTICS ARE TURNED ON, EXECUTION TIME INCREASES CONSIDERABLY.

BUT THE USER IS COMPLETELY UNAWARE OF THE PROCESSES DESCRIBED IN THE LAST FEW PARAGRAPHS. THE RESONSE HE RECEIVES IS

SUSPENDED
EXAMINE, PRINT, HOLD, OR DROP?

USE THE LETTERS E,P,H, OR D AS A RESPONSE. "E" WILL ALLOW EDITING OF THE SYMBIONT FILE CONTAINING THE OUTPUT FROM PROGRAM EXECUTION VIA MARYLAND UNIVERSITY'S TEST EDITOR.

ONE NOT OF WARNING: EDITING THE FILE IS DONE VIA THE UNIVERSTY OF MARYLAND TEXT EDITOR WHICH IS SOMEWHAT SIMILAR TO UNIVAC'S QED. SIMPLE COMMANDS SUCH AS P, N, C, R, I WILL WORK. MANY OTHERS WILL NOT.

WHEN YOU ARE FINISHED EXAMINING THE CONTENTS, TYPE "EXIT" (NOT QUITE). THE ABOVE RESPONSE WILL AGAIN APPEAR ON THE TERMINAL.

"P" WILL RESULT IN THE QUERRY

WHERE?

VALID LOCATIONS TO PRINT THE OUTPUT AT INCLUDE

PR <—ANY HIGH SPEED PRINTER PR2 <--"UNLINED" PAPER FROM MEDIUM SPEED PRINTER PR3 OR PR4 <--A PARTICULAR HIGH SPEED PTNTER DCT001 OR DCT002 OR DCT003 <—VERY LOW SPEED PRINTERS IN ROOMS 723 OR 827A

ASSUMING YOUR RESPONSE WAS "PR", THE SYSTEM WILL RESPOND WITH THIS MESSAGE:

SENT TO PR ; A1••••

WHERE A1•••• IS YOUR RUNID.
IF THE USER TYPES "M" THE FILE IS HELD, AND REMAINS WAITING UNTIL THE USER TYPES

@RESUME

OR

@&UON.RESUME . IF TPF& IS ERASED

THIS RESUMES THE SYSTEM'S QUERRY AS TO WHAT TO DO WITH YOUR PRINTFILE— EXAMINE, PRINT, HOLD OR DROP IT.
IN SUMMARY, THE PRINTFILE REMAINS AVAILABLE TO THE USER UNTIL HE EITHER @FIN'S, RERUNS MASTERFILE, OR ENTERS "D" TO DROP THE FILE IN RESPONSE TO THE EXAMINE, PRINT, HOLD, OR DROP QUERRY.
USING THE REMAINING FUNCTIONS OF MASTERFILE IS SIMILAR TO FUNCTION #1.
IN FIGURE 2-1 A SAMPLE TERMINAL SESSION APPEARS.

FIGURE 2-1. TERMINAL SESSION USING FUNCTION #1

```
@MASTERFILE
 UNCLASSIFIED.82MASTERFILE.MASTERFILE  LEVEL-9R17.2.79-150625-022479

 ENTER 0 IF THIS IS TO BE A BATCH (OR START) JOB OR 1 FOR A DEMAND JOB.
>1
 WHICH FUNCTION DO YOU WISH (TYPE 7 FOR A LIST)?
>7

 CHOOSE ONE OF THE FOLLOWING FUNCTIONS:
 1   CREATE A NEW RUNSTREAM TO EXECUTE THE PONCUS MODEL.
 2   CREATE A NEW ABSOLUTE BY RECOMPILING ALL PROGRAMS IN YOUR  RBD  FILE.
 3   CREATE A NEW ABSOLUTE BY COMPILING ONLY THE PROGRAMS YOU SPECIFY NOW.
 4   PRINT A MAP OF AN ABSOLUTE PROGRAM.
 5   PRINT A TABLE OF CONTENTS (TOC) FOR ALL BASP FILES.
 6   DELETE AN ABSOLUTE PROGRAM AND SOURCE PROGRAMS UNIQUE TO THAT ELEMENT.

 WHICH FUNCTION DO YOU WISH?
>9
 9 IS A BAD CHOICE--TRY 1,2,3,4,5, OR 6!
>1
 WHAT IS THE TITLE OF THIS RUN (<66 CHARACTERS)?
                                                                <--66
>ILLUSTRATIVE   EXAMPLE   OF   RUNNING   A   PROGRAM
 WHAT IS THE NAME OF YOUR INTLC FILE (FILENAME.FLTNAME/VERSION)?
>82INTLC.RUNSEC/BASE
 @ED.D 82INTLC.RUNSEC/BASE
 IS THIS CORRECT (Y OR N)?
>Y
 CHOOSE ONE OF THE FOLLOWING ABSOLUTE ELEMENTS TO EXECUTE BY NUMBER:

  1  82XQT.ABS/PROD  .  PRODUCTION
  2  82LEVEL-9.ABS   .  LEVEL-9
  3  82UPDATE.ABS    .  LEVEL-10, WITH PWRMS DIVERSION INTO MAINT
  4  82UPDATE.ABSMOD .  TEST MODULE FOR VARIABLE COMRAT
 YOUR CHOICE?
>3
 CHOOSE A DATIN DATA FILE BY NUMBER.

  1  82XQT.DATIN-DATA . ONE RUN--NO OPTIMIZATION
  2  82MA.DATIN-OPT   . NNRNS = 5--RUNS THE OPTIMIZATION
  3  82MA.DATIN-TEST  . TTFIN=20--STOP AFTER 20 DAYS FOR TESTING MODEL
 YOUR CHOICE?
>3

 DO YOU WANT A DUMP AFTER EXECUTION OR ONLY ON ERROR (Y OR N)?
>Y
```

```
 CHOOSE ANY OF THESE OPTIONS:
          E  DUMP ONLY ON ERROR
          F  FIELDATA ALPHANUMERIC FORMAT FOR DUMP
          B  FORTRAN "B" FORMAT FOR DUMP
          P  DUMP RUN'S PCT
          C  DUMP ONLY WORDS WHICH HAVE CHANGED DURING EXECUTION
 ENTER OPTIONS, SUCH AS                          EFB                          ????
>E
 SUSPENDED
 EXAMINE, PRINT, HOLD, OR DROP? >P
 WHERE? >PR
 SENT BY A182 : PR
```

2.2.2.3. COMPILING ALL USER PROGRAMS

IF THE USER HAD CHOSEN FUNCTION 2, ALL PROGRAMS IN HIS R&D FILE WOULD HAVE BEEN RECOMPILED VIA @FOR, @COB, @ASM, @PL/I, ETC. USE OF THIS FUNCTION IS STRAIGHT FORWARD. MASTERFILE WILL FIRST COPY ALL SYMBOLIC PROGRAMS WHICH CREATED THE CURRENT ABSOLUTE PROGRAM INTO A LIBRARY FILE.

BEFORE CONTINUING IT MAY BE USEFUL TO READ SECTION 3.1.2 WHICH GIVES A DESCRIPTION OF HOW MASTERFILE HANDLES USER FILES. MASTERFILE'S HANDLING OF USER FILES IS TRANSPARENT TO THE USER, BUT THE PROCESSOR ATTEMPTS TO KEEP TRACK OF WHAT ELEMENTS MADE UP AN ABSOLUTE ELEMENT.

ANYHOW THE ONLY INPUTS REQUIRED OF THE USER ARE THE NAME OF HIS R&D FILE AND A DESCRIPTION OF UP TO 48 CHARACTERS OF THE PROGRAM. BE SURE TO TYPE A PERIOD AFTER THE NAME OF THE R&D FILE. ENTERING

```
@2I@
```

IS ILLEGAL. WHAT IS NEEDED IS

```
@2I@.
```

THE OUTPUT FROM THE LINE PRINTER WILL BE ACCOMPANIED BY A PUNCH CARD DECK OF THE RUNSTREAM. THE RUNSTREAM WHICH COMPILES EACH PROGRAM IS CREATED BY THE FLIST PROCESSOR FROM THE UNIVERSITY OF MARYLAND.

AFTER RECOMPILING A NEW ABSOLUTE ELEMENT WILL BE CREATED WITH THE COLLECTOR (INVOKED BY @MAP).

FIGURE 2 SHOWS A TYPICAL TERMINAL SESSION WHICH WILL COMPILE ALL PROGRAMS INTO THE R&D FILE.

2.2.2.4. RECOMPILING SELECTED USER PROGRAMS

THIS FUNCTION RESULTS IN AN ACTION SIMILAR TO FUNCITON 2. INSTEAD OF ALL PROGRAMS IN THE R&D FILE BEING RECOMPILED, ONLY THOSE INDIVIDUAL PROGRAMS CHANGED SINCE THE LAST @FLIST ARE RECOMPILED.

THE NECESSARY KEYINS FOR THIS FUNCITON ARE THE NAME OF THE R&D FILE, PROGRAM NAMES, AND THE NEW ABSOLUTE PROGRAM NAMES.

2.2.2.5. THE REMAINING FUNCTIONS: COMING SOON!

THESE ARE STILL IN THE DEVELOPMENT STAGE AND ARE UNAVAILABLE TO THE USER. KEYING IN FUNCTIONS 4 OR 6 COULD BE USED TO SIMPLY PACK THE FILE. CHOOSING FUNCITON 5 RESULTS IN A BAURD MODE VIOLATION.

2.2.2.6. ABORTING MASTERFILE

TO TERMINATE EXECUTION OF MASTERFILE AT ANY TIME SIMPLY RESPOND

$$$X

TO ANY QUEARY. DO NOT BE AFRAID--ABSOLUTELY NO HARM WILL RESULT.

2.2.2.7. LOCATION OF THE RUNSTREAM FILE

THE RUNSTREAM OUTPUT BY MASTERFILE IS PLACED IN A TEMPORARY FILE WHOSE NAME IS

RUNSTREAM$$$.

SAVING RUNSTREAMS. SINCE AS FILE AND ELEMENT NAMES CHANGE ALL RUNSTREAMS BECOME OUTDATED.

2.2.2.8. START JOBS

IF A USER WISHES TO CREATE A START JOB INSTEAD OF A BATCH JOB MASTERFILE WILL REQUEST AN $RUN CARD:

TYPE AN $RUN CARD EXACTLY AS IT WILL APPEAR IN YOUR RUNSTREAM--OMIT ONLY THE $ SYMBOL--AND <72 CHARACTERS:

AN EXAMPLE RESPONSE IS

RUN,/RPT A182,I137DT8188,UNCLASSIFIED,S15,10

NOTE THAT THE "@" SYMBOL IS OMITTED! ACCIDENTLY ENTERING AN @ SYMBOL RESULTS IN

```
I/O CALLED AT LINE XXX IN MAIN PROGRAM
ATTEMPT TO READ PAST END OF FILE
```

WHERE XXX IS SOME NUMBER. THE USER MUST NOW TYPE @MASTERFILE AND START AGAIN.

DO NOT REQUEST THAT THE JOB BE STARTED IMMEDIATELY. THE RUNSTREAM MUST BE COPIED INTO A PERMANENT START FILE, SUCH AS START*@2BATCH-JOB VIA

```
@COPY.I RUNSTREAM666.,START*@2BATCH-JOB.XXX
```

WHERE XXX IS AN ELEMENT NAME.
THEN TYPE

```
@START START*@2BATCH-JOB.XXX
```

TO START THE JOB.

THE NEXT REVISION OF MASTERFILE WILL CONTAIN FEATURES TO CORRECT THESE LOOSE EDGES.

2.2.2.9. EMPLOYING OTHER MASTERFILE FUNCTIONS

2.2.3. @SUSPEND/@RESUME

AT THE END OF MASTERFILE EXECUTION, IF THE RUNSTREAM WAS DYNAMICALLY @ADD'D, THE SUSPEND/RESUME PROCESSOR WILL QUERY:

```
EXAMINE, HOLD, PRINT, OR DROP?
```

TYPING THE LETTER E WILL PUT THE USER IN THE EDIT MODE TO EXAMINE THE CONTENTS OF THE SYMBIONT FILE. THUS YOUR CAN SEE IF YOUR PROGRAM WORKED BEFOR SENDING IT TO THE LINE PRINTER.

SINCE THE SUSPEND/RESUME IS A UNIVERSITY OF MARYLAND PROCESSOR, YOU WILL BE IN THE EDIT MODE USING THE UNIVERSITY OF MARYLAND'S EDITOR, WHICH IS SOMEWHAT EQUIVALENT TO THE UNIVAC EDITOR AT CAA. CONSEQUENTLY SOME COMMANDS WILL NOT WORK.

AFTER EDITING THE FILE TYPE

EXIT

AND THE EARLIER QUERY WILL REAPPEAR.
NEXT. IF THE RESPONSE IS THE LETTER P, THE OUPUT FILE WILL BE SENT TO THE LINE PRINTER. THE NEXT QUERY IS

WHERE? CHOOSE ONE OF THE SITES LISTED EARLIER (PR, DCTD01, ETC.).
FINALLY IF YOU WANT THE SYM FILE DESTROYED, TYPE THE LETTER D AND THE FILE WILL BE DROPPED.

3. PROGRAMMER'S GUIDE

MASTERFILE IS A FORTRAN PROGRAM WHICH IMPLEMENTS THE SIX FUNCTIONS DESCRIBED BY OPTIONS D,F,M,R,I, AND X IN TABLE 2-3.

3.1. MASTERFILE INPUT AND OUTPUT FILES

3.1.1. INPUTS TO MASTERFILE

SINCE MASTERFILE IS A CONVERSATIONAL PROGRAM MOST INPUTS ARE SOLICITED FROM THE USER VIA READ STATEMENTS.

THE PRIMARY OUTPUT OF MASTERFILE IS A RUNSTREAM OF EXEC 8 CONTROL STATEMENTS THAT IS @ADD'D WHEN MASTERFILE TERMINATES. CONSEQUENTLY SOME OF THE CONTROL STATEMENTS INSERTED IN THE RUNSTREAM ARE COPIED FROM CANNED JCL IN FILE 82RUNS.

ANOTHER INPUT TO MASTERFILE IS 82MASTERDATA, WHICH CONTAINS THE NAMES OF ALL BASP IV ABSOLUTE PROGRAMS, ALL DATIN SUBPROGRAM INPUT DECKS, AND A 48 CHARACTER DESCRIPTION OF EACH ABSOLUTE AND DATIN-DATA ELEMENT.

3.2. OUTPUTS FROM MASTERFILE

THE OUTPUT RUNSTREAM IS PUT IN TEMPORARY FILE RUNSTREAM$$$. ANOTHER TEMPORARY JCL FILE IS ALSO CREATED. JCL$$$. THIS SECOND FILE @ED'ITS RUNSTREAM$$$. TO REMOVE SPACES IN EACH CONTROL STATEMENT. FOR EXAMPLE, IN THE STATEMENT

```
@ED,R    INTLC-ELT.                ,15.
```

MUST BE CHANGED TO

```
@ED,R        INTLC-ELT,15.
```

3.3. RUNSTREAM INPUTS AND OUTPUTS

THE RUNSTREAM RUNSTREAM$$$. , WHETHER IT COMPILES USER WRITTEN GASP IV SUBPROGRAM OR EXECUTES THE ABSOLUTE ELEMENT. MAKES USE OF FOUR FILES FOR INPUT AND OUTPUT.

1. THE USER SPECIFIES HIS R8D FILE WHICH CONTAINS SOURCE PROGRAMS HE HAS WRITTEN.

2. THESE SYMBOLIC PROGRAMS ARE COPIED TO FILE @2UPDATE., WHICH CONTAINS THE LATEST VERSION OF EACH SYMBOLIC USER WRITTEN SUBPROGRAM. ALSO THE RELOCATABLE ELEMENTS CREATED BY @FOR STATEMENTS ARE ALSO INSERTED IN @2 UPDATE. FINALLY, THE ABSOLUTE ELEMENT CREATED FROM THESE PROGRAMS IS ALSO STORED IN THIS FILE.

3. BEFORE (2) IS PERFORMED, SYMBOLIC ELEMENTS WITH SAME NAME IN @2 UPDATE. AND THE USER R8D FILE ARE @COPY'D INTO @2LIBRARY. THEN THE RELOCATABLE ELEMENTS FROM MASTERFILE'S LAST USE ARE @ERASE'D. @2LIBRARY CONTAINS OLD SOURCE AND ABSOLUTE PROGRAMS. THUS ALL PROGRAMS WHICH MAKE UP A PARTICULAR ABSOLUTE ARE SAVED.

4. @2@ASP CONTAINS SOURCE AND RELOCATABLE GASP IV SUBPROGRAMS. THIS FILE IS ONLY REFERENCED ON A LIB COLLECTOR DIRECTIVE FOLLOWING THE @MAP STATEMENT IN FILE RUNSTREAM$$$.

@2RUNS., @2 GASP., AND, PROBABLY, THE USER R8D FILE RESIDE ON REMOVABLE DISK PACK 36. THE REMAINING FILES ARE CATALOGUED ON PACKS 8440A, 8440C, AND 8440D, WHICH ARE RARELY DISMOUNTED ON WEEKDAYS. ONE MAY DISCERN IF THESE FOUR PACKS ARE MOUNTED VIA

```
@MSCON,X      , CHECK FOR 8440'S
@MSCON,Y      , CHECK FOR PACK36
```

THE FOLLOWING SECTIONS GIVE A DESCRIPTION AND SOURCE LISTINGS OF MAJOR MASTERFILE SOURCE PROGRAMS.

3.4. SOURCE PROGRAMS

3.4.1. MAIN PROGRAM

```
      IMPLICIT INTEGER (A-Z)
      DIMENSION ASG(4),USE(5),RUN(12),HDG(12),START(4),ADD(4),FREE(4),
     +PROCRD(12)
      DATA ASG/'@ASG,T','  RUNST','REAMSS','$,   ,  '/
      DATA USE /'@USE   ','1D.,   ','RUNSTR','EAMSSS','$,   ,   '/
      DATA START /'@START','  $2RS','      ','    .  '/
      DATA ADD /'@ADD,L','  RUNST','REAMSS','$,   ,  '/
      DATA FREE/'@FREE  ','RUNSTR','EAMSSS','$,   ,  '/
C MASTERFILE MAIN PROGRAM
C
C OUTLINE:
C     I. PRINT GREETING
C     II. ASG RUNSTREAM FILE FROM ER TIMES, PRINT FUNCTION CHOICES
C     III. ADD @RUN AND @HDG CARDS
C     IV. CALL APPROPRIATE FUNCTION ROUTINE
C     V. AFTER RETURN, PACK FILES AND FINISH RUNSTREAM
C
C VARIABLE DEFINITIONS:
C     TIME IS THE TIME MASTERFILE SIGNED ON.
C
C ***************STEP I.*****************************************
      READ (5,150) PROCRD
      CALL OPT(VALUE)
      CALL ERTRAN (9,DATE,TIME)
C
C PRINT PROCESSOR SIGN ON IMAGE
      PRINT 90,TIME,DATE
  90  FORMAT (' UNCLASSIFIED*@2MASTERFILE,MASTERFILE  LEVEL-9P17.2.79-'
     +,A6,'-',A6,/)
C
C
      PRINT 120
 120  FORMAT (' ENTER 0 IF THIS IS TO BE A BATCH (OR START) JOB OR 1',
     +' FOR A DEMAND JOB.')
      READ (5,135) R
  1   CONTINUE
 130  FORMAT (10I5)
C ***************STEP II.****************************************
```

```
C ASK THE USER IF HE WANTS A LIST OF THE FUNCTIONS.
C
      PRINT 111
  111 FORMAT (' WHICH FUNCTION DO YOU WISH (TYPE 7 FOR A LIST)?')
      READ (5,135) CHOICE
      IF (CHOICE.NE.7) GOTO 47
      PRINT 110
  110 FORMAT (//' CHOOSE ONE OF THE FOLLOWING FUNCTIONS:',/,
     +' 1   CREATE A NEW RUNSTREAM TO EXECUTE THE POMCUS MODEL.'
     +,/,' 2   CREATE A NEW ABSOLUTE BY RECOMPILING ALL PROGRAMS'
     +,' IN YOUR  R&D  FILE.',/,' 3   CREATE A NEW ABSOLUTE'
     +' BY COMPILING ONLY THE PROGRAMS YOU SPECIFY NOW.'
     +,/,' 4   PRINT A MAP OF AN ABSOLUTE PROGRAM.',/,' 5   PRINT'
     +' A TABLE OF CONTENTS (TOC) FOR ALL GASP FILES.',/,' 6   '
     +'DELETE AN ABSOLUTE PROGRAM AND SOURCE PROGRAMS UNIQUE TO'
     +' THAT ELEMENT.',//,' WHICH FUNCTION DO YOU WISH?')
    4 READ (5,135) CHOICE
  135 FORMAT (1I1)
   47 IF (CHOICE .LT. 1. OR. CHOICE.GT.6) GOTO 44
      GOTO 45
   44 PRINT 46,CHOICE
   46 FORMAT (1X,I1,' IS A BAD CHOICE--TRY 1,2,3,4,5, OR 6!')
      GOTO 4
C GET DATA
C ASG FILE FOR RUNSTREAM
   45 CALL ERTRAN(6,ASG)
C USE FILE AS FORTRAN UNIT 10
      CALL ERTRAN (6,USE)
C
C ***************STEP III.*****************************************
C
C @RUN CARD
      IF (R) 1,2,3
    2 PRINT 140
  140 FORMAT (' TYPE AN @RUN CARD EXACTLY AS IT WILL APPEAR IN YOUR'
     +,/,' RUNSTREAM--OMIT ONLY THE @ SYMBOL--AND <72 CHARACTERS!'
     +,/,72X,'<--72')
      READ (5,150) (RUN(I),I=1,12)
  150 FORMAT (12A6)
      WRITE (10,151) (RUN(I),I=1,12)
  151 FORMAT ('@',12A6)
      GOTO 33
C
C INSERT @@RKPT IN THIS DEMAND JOB
    3 WRITE (10,155)
  155 FORMAT ('@@@UOM.SUSPEND',/,'@LIB.TIME')
C
C @HDG CARD
   33 PRINT 160
  160 FORMAT (' WHAT IS THE TITLE OF THIS RUN (<66 CHARACTERS)?',/
```

```
     +,66X,'<--66 ')
      HDG(1) = '$HDG  '
      READ (5,150) (HDG(K), K=2,12)
      WRITE (10,150) (HDG(K),K=1,12)
C
C ****************STEP IV.*****************************************
      GOTO (5,6,7,8,9,10), CHOICE
 5    CALL SUBRUN
      GOTO 11
 6    CALL SUBFLI
      GOTO 11
 7    CALL SUBREC
      GOTO 11
 8    CALL SUBMAP
      GOTO 11
 9    CALL SUBPRT
      GOTO 11
 10   CALL SUBDEL
C
C ****************STEP IV.*****************************************
 11   IF (CHOICE.EQ.2.OR.CHOICE.EQ.3) CALL SUBPAK
C
C
C
C R=0 IS BATCH, R=1 IS DEMAND
      IF(R) 12,12,13
 12   PRINT 180
 180  FORMAT (' DO YOU WANT TO START THIS BATCH JOB IMMEDIATELY?'
     +,'  (Y OR N)')
      READ (5,150) W
C CLOSE RUNSTREAM FILE AND SED THE SPACES OUT
      CALL SUBED(CHOICE,R)
C
C
      IF (W.EQ.'N') GOTO 15
      PRINT 185
 185  FORMAT (' THIS FACILITY IS NOT YET ACTIVE.  JUST COPY YOUR'
     +' RUNSTREAM INTO',/,' A     START.----.    FILE.')
 15   PRINT 170
 170  FORMAT (' READY')
      GOTO 16
C
C INSERT $$BKPT FOR DEMAND RUN
 13   WRITE (10,190)
 190  FORMAT ('$LIB.TIME',/,'$$$BUCH.RESUME')
C
C CALL SUBED TO CREATE & $ADD THE JCL TO EDIT THE SPACES OUT OF THE
C RUNSTREAM.  ALSO CLOSE THE RUNSTREAM FILE.
C
      CALL SUBED(CHOICE,R)
```

```
C
C @ADD THE OUTPUT RUNSTREAM
C
 16   CALL ERTRAN (6,20H@ADD JCL$$$. .                    )
C
      STOP
      END
```

3.4.2. SUBROUTINES

3.4.2.1. SUBRUN

```
      SUBROUTINE SUBRUN
C
C OUTLINE
C   I. CREATE THE FOLLOWING, MODEL RUNSTREAM
C
C
C
C
C
C VARIABLE DICTIONARY
C
C     NAME(I,K) <---NAME OF DATIN-DATA FILES
C     I IS THE USER CHOSE OF FILES
C
C     DNAME(C,K) <---NAME OF INTLC-DATA FILE
C     C IS THE USER CHOICE
C
C     INTLC(K) <---NAME OF INTLC-DATA FILE
C
C
      IMPLICIT INTEGER (A-Z)
      DIMENSION INTLC(7), NAME(20,11), DNAME(20,11)
      DIMENSION NO(20)
C
      WRITE (10,100)
 100  FORMAT (1H@DELETE,C 82OPTIMIZAT.,/,1H@DELETE,C 82DIAGNOSTIC.,/,
     +1H@DELETE,C 82SHORT-DIAG.,/,/,1H@ASG,T 15.)
C
C GET INTLC FILE NAME
 1     PRINT 110
 110  FORMAT (1H WHAT IS THE NAME OF YOUR INTLC FILE (FILENAME.FLT
     +1HNAME/VERSION)?)
      READ (5,120) INTLC
```

```
 120  FORMAT (10A6)
C
C PUT @ED IN RUNSTREAM — CHECK FIRST WITH THE USER
      WRITE (6,130) (INTLC(I),I=1,7)
 130  FORMAT (' @ED,D ',7A6,/,' IS THIS CORRECT (Y OR N)?')
      READ (5,120) A
      IF (A.EQ.'N') GOTO 1
      WRITE (10,140) (INTLC(I),I=1,7)
 140  FORMAT ('@ED,D ',7A6,',15.',/,'EXIT',/,'@ASG,UP B2DIAGNOSTIC.'
     +',F///3000',/,'@ASG,UP B2SHORT-DIAG.,F///3000',/,
     +'@ASG,UP B2OPTIMIZAT.',/,'@USE 17.,B2OPTIMIZAT.',/,
     +'@USE 14.,B2SHORT-DIAG.',/,'@USE 13.,B2DIAGNOSTIC.')
C
C CHOOSE ABSOLUTE ELEMENT TO EXECUTE
 1    PRINT 150
 150  FORMAT (' CHOOSE ONE OF THE FOLLOWING ABSOLUTE ELEMENTS TO'
     +' EXECUTE BY NUMBER:',/)
C
C GET AND WRITE ABSOLUTE NAMES FROM B2MASTERDATA
      CALL ERTRAN (6,30H@ASG,A B2MASTERDATA.                    )
      CALL ERTRAN (6,30H@USE 19.,B2MASTERDATA.                  )
      READ  (19,160) STOP
      DO 5 I=1,STOP
      READ (19,160) NO(I),(DNAME (I,K), K=1,11)
      PRINT 160,NO(I),(DNAME(I,K),K=1,11)
 5    CONTINUE
      PRINT 170
      READ (5,175) C
C
C PUT @ADD DATIN-DATA IN RUNSTREAM
      PRINT 200
 200  FORMAT (' CHOOSE A DATIN DATA FILE BY NUMBER.',/)
C
C GET NAMES FROM B2MASTERDATA
      READ (19,160) STOP
      DO 2 I=1,STOP
      READ (19,160) NO(I),(NAME(I,K),K=1,11)
 160  FORMAT (1X,I2,2X,11A6)
      PRINT 160, NO(I),(NAME(I,K),K=1,11)
 2    CONTINUE
      PRINT 170
 170  FORMAT(' YOUR CHOICE?')
      READ (5,175) I
 175  FORMAT (BI1)
C
C PUT @PRT,S IN RUNSTREAM
      WRITE (10,180) (NAME(I,K),K=1,10),(INTLC(K),K=1,7)
 180  FORMAT ('@PRT,S ',10A6,/,'@PRT,S ',10A6)
C
C PUT @XQT IN RUNSTREAM
```

```
      WRITE (10,190) (DNAME (C,K),K=1,11)
  190 FORMAT ('@XQT ',11A6)
      WRITE (10,220) (NAME(I,K),K=1,11)
  220 FORMAT ('@ADD,P ',11A6)
C
C ADD @PMD OPTION
      PRINT 230
  230 FORMAT (//' DO YOU WANT A DUMP AFTER EXECUTION OR ONLY ON'
     +' ERROR (Y OR N)?')
      READ (5,120) R
      IF (R .EQ. 'N') GOTO 7
      PRINT 240
  240 FORMAT (/,' CHOOSE ANY OF THESE OPTIONS:',/,10X,'E  DUMP ONLY ON'
     +' ERROR',/,10X,'F  FIELDATA ALPHANUMERIC FORMAT FOR DUMP',/,
     +10X,'@  FORTRAN "G" FORMAT FOR DUMP',/,10X,'P  DUMP RUN''S PCT',
     +/,10X,'C  DUMP ONLY WORDS WHICH HAVE CHANGED DURING EXECUTION',
     +/,' ENTER OPTIONS, SUCH AS',20X,
     +'EF@',20X,'OR ???')
      READ (5,120) OPT
      WRITE (10,250) OPT
  250 FORMAT ('@PMD,DO',A6)
C
  7   RETURN
      END
```

3.4.2.2. SUBFLI

```
      SUBROUTINE SUBFLI
C OUTLINE:
C     I. COPY ALL PROGRAMS FROM 82UPDATE TO 82LIBRARY.
C     II. COMPILE ALL PROGRAMS FROM 82GASP INTO 82UPDATE.
C     III. MAP AN ABSOLUTE ELEMENT.
      DIMENSION ABSNAM(2),NEWABS(11),FN(2)
      IMPLICIT INTEGER (A-Z)
C
C BLANK ARRAYS OF ALPHANUMBERIC DATA
      DO 1 I=1,11
  1   NEWABS(I) = '      '
C
C ****************STEP I.**************************************
C GET THE ABSOLUTE PROGRAM NAME.
      CALL SUBNAM(1,ABSNAM)
C WRITE TO RUNSTREAM
      WRITE (10,100) (ABSNAM(I),I=1,2)
  100 FORMAT ('@COPY,SV 82UPDATE.,82LIBRARY./',2A6,/,'@ASG,T SCRATCH',
     +/,'@COPY,A 82UPDATE.,SCRATCH.',/,'@ERS 82UPDATE.',/,
     +'@COPY,A SCRATCH.,82UPDATE.')
C
```

```
C UPDATE THE MAP
      CALL UPMAP(ABSNAM)
C
C ••••••••••••••••••STEP II.••••••••••••••••••••••••••••••••••••••••••
      PRINT 105
  105 FORMAT (' ENTER THE R & D FILE WHICH CONTAINS YOUR SYMBOLIC PROG'
     +'RAMS.',/,' WARNING:  BE SURE TO TYPE A PERIOD AFTER THE FILE'
     +'NAME!')
      READ (5,106) FN(1),FN(2)
  106 FORMAT (10A6)
      WRITE (10,110) (FN(I),I=1,2),FN(1),FN(2),FN(1),FN(2)
  110 FORMAT ('@HDG  ••PROC••',/,'@PDP,ILF ',2A6,',PROC',/,
     +'@ADD ',2A6,',PROC',/,
     +'@FLIST,GXYLTU ',2A6,',@2UPDATE,,@2UPDATE,')
C
C ••••••••••••••••••STEP III.•••••••••••••••••••••••••••••••••••••••••
C REQUEST THE NEW ABSOLUTE PROGRAM NAME
      PRINT 120
  120 FORMAT (' ENTER ELEMENT NAME FOR YOUR NEW ABSOLUTE PROGRAM.',
     +/,'  FOR EXAMPLE ',//,' ABS1',//,' DO NOT USE A VERSION',
     +'NAME!')
C PUT NEW ABSOLUTE PROGRAM NAME
      CALL SUBNAM(2,ABSNAM)
      READ (5,106) NEWABS(1),ABSNAM(2)
      NEWABS(3) = '    ,  '
      PRINT 145
  145 FORMAT  (' ENTER UP TO 48 CHARACTERS OF DESCRIPTION OF THE PROGRAM
     +.',/,60X,'<---48')
      READ (5,106) (NEWABS(I), I=4,11)
  130 FORMAT (24A6)
C WRITE AN @MAP IN RUNSTREAM TO CREATE AN ABSOLUTE ELEMENT
      WRITE (10,140) (NEWABS(I),I=1,10)
  140 FORMAT ('@PREP @2GASP.',/,'@PREP @2UPDATE.',/,
     +'@MAP,IS ,@2LIBRARY.',10A6, /,'IN @2UPDATE.',/,
     +'NOT TPFS:',/,'LIB @2GASP.',/,'END')
C
      RETURN
      END
```

3.4.2.3. SUBREC

```
      SUBROUTINE SUBREC
C
C PURPOSE:  RECOMPILE SELECTED USER PROGRAMS FROM USER SPECIFIED FILE AND
C     CREATE A NEW ABSOLUTE ELEMENT.
C
C OUTLINE:
C     1.SOLICIT USER FOR R & D FILENAME, NEW PROGRAM NAMES, AND ABSOLUTE
```

```
C      PROGRAM NAMES WITH DOUMENTATION.
C      II. GET OLD ABSOLUTE PROGRAM NAME.
C      III.WRITE INTO RUNSTREAM:
C       @HDO
C       @COPY,S B2UPDATE—,B2LIBRARY—/ABSNAME
C       @FOR,S R8D FILE, B2UPDATE, B2UPDATE
C      IV. MAP NEW ELEMENT:
C       @MAP,S   ,B2UPDATE.NEWABS
C       IN NEWPROG
C         .
C         .
C         .
C       LIB B2BASP.
C       @EOF
C
C
C DIMENION ARRAYS
      IMPLICIT INTEGER (A-Z)
      DIMENSION FN(2)          @NAME OF USER R8D FILE
      DIMENSION NAMES(20)      @NAMES OF NEW PROGRAMS
        DIMENSION   ABSNAM(11)    @ABSOLUTE  ELEMENT  NAME  TO  BE  CREATE
DESCRIPTION
      DIMENSION OLDABS(2)      @NAME OF LATEST ABS ELEMENT
      DOUBLE PRECISION NAMES
C
C ***********************STEP I.*********************************
      PRINT 100
  100 FORMAT (' ENTER THE R 8 D FILE WHICH CONTAINS YOUR SYMBOLIC PROG'
     +'RAMS.',/,' WARNING:  BE SURE TO TYPE A PERIOD AFTER THE FILE'
     +'NAME!')
      READ (5,110) (FN(I),I=1,2)
  110 FORMAT (11A6)
      PRINT 120
  120 FORMAT (' ENTER THE ELEMNT NAMES (1-12 CHARACTERS) THAT YOU WISH'
     +' TO COMPILE.',/,' TYPE ONE NAME ON EACH LINE FOLLOWED BY '
     +'"TRANSMIT."  TYPE "8EOF" AFTER THE',/,' LAST ELEMENT NAME.')
      NNAMES = 0
      DO 1 I=1,20
      READ (5,115,END=4,ERR=4) NAMES(I)
  115 FORMAT (6A12)
      NNAMES=NNAMES+1
    1 CONTINUE
    4 PRINT 130
  130 FORMAT (' ENTER ELEMENT NAME FOR YOUR NEW ARSOLUTE PROGRAM.',
     +/,'  FOR EXAMPLE ',//,' ABS1',//,' DO NOT USE A VERSION',
     +'NAME!')
      READ (5,110) ABSNAM(1),ABSNAM(2)
      ABSNAM(3) = '    .   '
      PRINT 140
  140 FORMAT  (' ENTER UP TO 48 CHARACTERS OF DESCRIPTION OF THE PROGRAM
```

```
     +,'(/,40X,'<---68')
      READ (5,110) (ABSNAM(I), I=4,11)
C
C ••••••••••••••••••••••••••STEP II.••••••••••••••••••••••••••••••••••
      CALL SUBNAM (1,OLDABS)
      CALL SUBNAM (2,ABSNAM)
C
C ••••••••••••••••••••••••••STEP III.•••••••••••••••••••••••••••••••••
      DO 2 I=1,NNAMES
      WRITE (10,150) NAMES(I),NAMES(I),NAMES(I),OLDABS(1),OLDABS(2),
     +FN(1),FN(2),NAMES(I),NAMES(I),NAMES(I)
  150 FORMAT ('@WDB ••••• ',A12,' •••••',/,'@COPY,S 82UPDATE.',A12,
     +',82LIBRARY.',A12,' /',2A6,/,'@FOR,S ',2A6,A12,',82UPDATE.',A12,
     +',82UPDATE.',A12)
    2 CONTINUE
C
C ••••••••••••••••••••••••••STEP IV.••••••••••••••••••••••••••••••••••
      WRITE (10,160) (ABSNAM(I),I=1,9)
  160 FORMAT ('@PREP 82@ASP.',/,'@PREP 82UPDATE.',/,
     +'@MAP,IS ,82UPDATE.',9A6)
      DO 3 I=1,NNAMES
      WRITE (10,170) NAMES(I)
  170 FORMAT ('IN   82UPDATE.',A12)
    3 CONTINUE
      WRITE (10,180)
  180 FORMAT ('IN 82UPDATE.MAIN',2(/,'LIB  82UPDATE.,82@ASP.'))
C
C FIN!!!!!!!!!!!
C
      RETURN
      END
```

3.4.2.4. SUBED(CHOICE,R)

```
      SUBROUTINE SUBED(CHOICE,MODE)
      IMPLICIT INTEGER (A-Z)
C
C OUTLINE
C I. CLOSE RUNSTREAM FILE 10 SO THAT IT MAY BE USED AS A TEMPORARY
C      JCL FILE.
C
C II. @ASG A TEMPORARY JCL FILE.
C
C III. WRITE @ED RUNSTTREAM INTO JCL FILE.
C
C IV. CSF% @ADD JCL FILE.
C
C IF MODE IS 1, JOB IS DEMAND  MODE=0 IS BATCH
```

```
C
C ***********************STEP I.************************
C
      ENDFILE 10
      REWIND 10
C
C ***********************STEP II.***********************
C
      CALL ERTRAN (6,30H@ASG,T JCL$$$.  ,                )
      CALL ERTRAN (6,30H@USE 12,,JCL$$$.  ,                )
      CALL ERTRAN (6,30H@ASG,T @2SYMBIONT. ,               )
C
C ***********************STEP III.**********************
C
      WRITE (12,100)
  100 FORMAT ('@@RKPT PRINT$/@2SYMBIONT' ,
     +/, '@ED,U RUNSTREAM$$$.' ,/, '@ADD @2MASTERFILE.MACROS',/,
     +'FIX',/,'EXIT')
  110 FORMAT ('@@RKPT PRINT$')
C
C ***********************STEP IV.***********************
C
C IF MODE IS BATCH (=0) DO NOT @ADD RUNSTREAM
C
      IF (MODE.EQ.0) GOTO 3
C
      IF (CHOICE.EQ.1.OR.CHOICE.EQ.5) GOTO 1
  120 FORMAT ('@ADD,L RUNSTREAM$$$.')
C
C ASK USER IF HE WANTS TO @ADD RUNSTREAM.
C
      PRINT 220
  220 FORMAT(' DO YOU WANT TO @ADD THE RUNSTREAM IMMEDIATELY (Y OR N)?')
      READ (5,150) A
  150 FORMAT (A1)
C
      IF (A.EQ.'Y') GOTO 1
      PRINT 130
  130 FORMAT (' READY')
    3 WRITE (12,110)
      GOTO 2
    1 WRITE (12,120)
    2 ENDFILE 12
      REWIND 12
      RETURN
      END
```

3.5. SAMPLE DATIN DATA DECK

THE FOLOWING IS A SAMPLE INPUT DECK TO THE BASP IV SUBROUTINE DATIN.

```
$GENRAL
 NNAME(1)=6HSSIPL ,6HOPTIMI ,6HZATION  ,
 NNPRJ=8001, NNRNS=001, LLSUP(4)=2,2, LLSUP(9)=2,2, LLSUP(12)=2,0,1
$END
$STATIS
 NNCLT=12, NNPLT=4
$END
$LIMITS
 NNSTR=1, NNTRY=1000, NNATR=7, NNFIL=1, NNSET=10000
$END
$COLCT
 I=1,  LLABC(1,1) = 6HPRMNEN, 6HT LOSS
$END
$COLCT
 I=2,  LLABC(2,1) = 6HTHEATR, 6H STOCK
$END
$COLCT
 I=3,  LLABC(3,1) = 6HWAR RE, 6HSERVES
$END
$COLCT
 I=4,  LLABC(4,1) = 6HAUTH S, 6HTRENGT
$END
$COLCT
 I=5,  LLABC(5,1) = 6HCOMMIT, 6HTED UN
$END
$COLCT
 I=6,  LLABC(6,1) = 6HMAINT , 6HRETURN
$END
$COLCT
 I=7,  LLABC(7,1) = 6HUNECON, 6HON FIX
$END
$COLCT
 I=8,  LLABC(8,1) = 6HONSTAT, 6HION UN
$END
$COLCT
 I=9,  LLABC(9,1) = 6HPOMCUS, 6H UNITS
$END
$COLCT
 I=10, LLABC(10,1) = 6HMCONUS , 6HUNITS
$END
$COLCT
 I=11, LLABC(11,1) = 6HUNIT A, 6HRRIVED
$END
```

```
$COLCT
 I=12, LLABC(12,1) = 6HCOMMIT, 6HTED UN
$END
$PLOT
 I=1, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H , IITAP(1)=2, NNVAR(1)=8,
 LLPLT=2
  DTPLT(1)=0.5
$END
$PLTVAR
 IJ=1,  LLSYM(1)=1HP, LLABP(1,1)=6HPRMNEN, 6HT LOSS,
  LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=154.
$END
$PLTVAR
 IJ=2,  LLSYM(2)=1HT, LLABP(2,1)=6HTHEATR, 6H STOCK,
  LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=154.
$END
$PLTVAR
 IJ=3,  LLSYM(3)=1HR, LLABP(3,1)=6HWAR RE, 6HSERVES,
  LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=154.
$END
$PLTVAR
 IJ=4,  LLSYM(4)=1HA, LLABP(4,1)=6HAUTH S, 6HTRENGT,
  LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=154.
$END
$PLTVAR
 IJ=5,  LLSYM(5)=1HC, LLABP(5,1)=6HCOMMIT, 6HTED UN,
  LLPLO(5)=1, LLPHI(5)=2, PPHI(5)=154.
$END
$PLTVAR
 IJ=6,  LLSYM(6)=1HM, LLABP(6,1)=6HMAINT , 6HQUEUE ,
  LLPLO(6)=1, LLPHI(6)=2, PPHI(6)=154.
$END
$PLTVAR
 IJ=7,  LLSYM(7)=1HU, LLABP(7,1)=6HUNECON, 6HOM FIX,
  LLPLO(7)=1, LLPHI(7)=2, PPHI(7)=154.
$END
$PLTVAR
 IJ=8,  LLSYM(8)=1HS, LLABP(8,1)=6HIN TRA, 6HNSIT  ,
  LLPLO(8)=1, LLPHI(8)=2, PPHI(8)=154.
$END
$PLOT
 I=2, LLABP(11,1) = 4HTIME, IITAP(2)=3, NNVAP(2)=6, LLPLT=2,
 I=2, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H , IITAP(2)=3, NNVAP(2)=6,
 LLPLT=2
  DTPLT(1)=0.5
$END
$PLTVAR
 IJ=1,  LLSYM(1)=1HO, LLABP(1,1)=6HONSTAT, 6HTON UN,
  LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
$END
```

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UNCLASSIFIED CAA-TP-79-1 NL

2 OF 2
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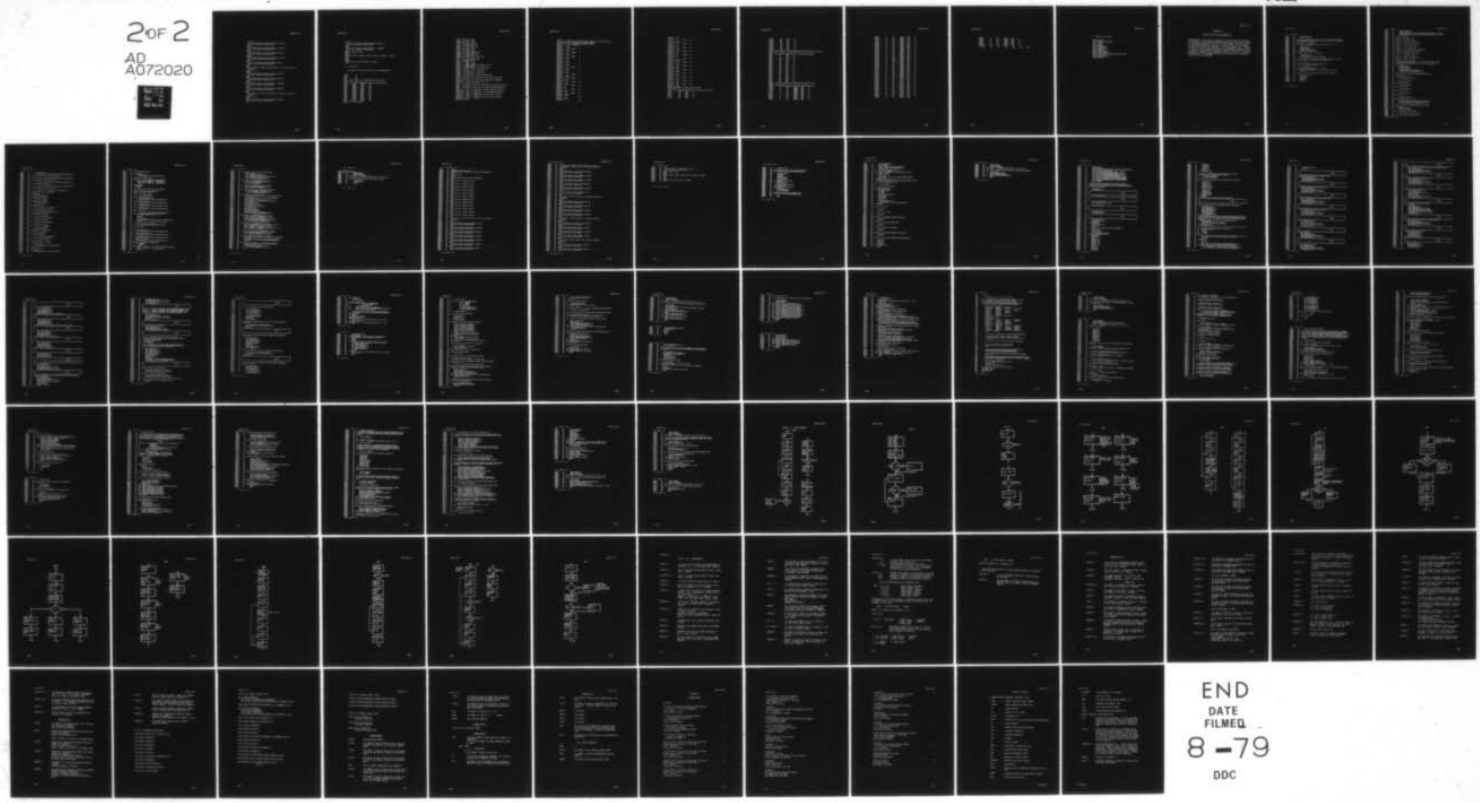

END
DATE
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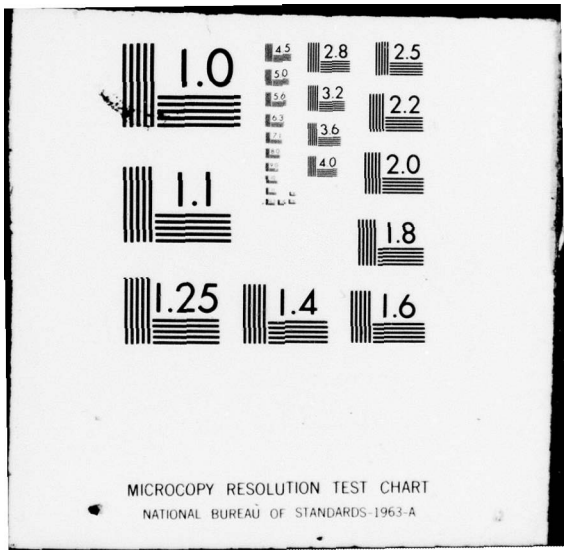
1.0
1.1
1.25
4.5
5.0
5.6
6.3
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
1.4
1.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
$PLTVAR
 IJ=2,  LLSYM(2)=1HP, LLABP(2,1)=6HPOMCUS, 6H UNITS,
  LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=20.
$END
$PLTVAR
 IJ=3,  LLSYM(3)=1HK, LLABP(3,1)=6HCONUS , 6H UNITS,
  LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=20.
$END
$PLTVAR
 IJ=4,  LLSYM(4)=1HA, LLABP(4,1)=6HUNCOMM, 6HITTED ,
  LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=20.
$END
$PLTVAR
 IJ=5,  LLSYM(5)=1HC, LLABP(5,1)=6HCOMMIT, 6HTED UN,
  LLPLO(5)=1, LLPHI(5)=2, PPHI(5)=20.
$END
$PLTVAR
 IJ=6,  LLSYM(6)=1HT, LLABP(6,1)=6HCOMMIT, 6HTED   ,
  LLPLO(6)=1, LLPHI(6)=2, PPHI(6)=20.
$END
$PLOT
 I=3, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H , IITAP(3)=4, NNVAR(3)=4,
 LLPLT=2
  DTPLT(1)=0.5
$END
$PLTVAR
 IJ=1,  LLSYM(1)=1HP, LLABP(1,1)=6HPRMNEN, 6HT LOSS,
  LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
$END
$PLTVAR
 IJ=2,  LLSYM(2)=1HT, LLABP(2,1)=6HTEMPRA, 6HRY LOS,
  LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=20.
$END
$PLTVAR
 IJ=3,  LLSYM(3)=1HM, LLABP(3,1)=6HMAINT , 6HRETURN,
  LLPLO(1)=1, LLPHI(1)=2, PPHI(3)=20.
$END
$PLTVAR
 IJ=4,  LLSYM(4)=1HR, LLABP(4,1)=6HPWRS R, 6HESERVE,
  LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=20.
$END
$PLOT
 I=4, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H , IITAP(4)=7, NNVAR(4)=3,
  LLPLT=2
  DTPLT(1)=0.5
$END
$PLTVAR
 IJ=1,  LLSYM(1)=1HT, LLABP(1,1)=6HTK FRO, 6HM THSK,
  LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=200.
$END
```

```
 $PLTVAR
  IJ=2,  LLSYM(2)=1HN, LLABP(2,1)=6HTK W/N, 6HO CREW,
   LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=200.
 $END
 $PLTVAR
  IJ=3,  LLSYM(3)=1HC, LLABP(3,1)=6HAVAIL   , 6HCREW/4,
   LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=200.
 $END
 $PRIORI  KKRNK=1, IINN=1
 $END
 $INITAL
  MSTOP=1, JJCLR=1, JJBEG=1, TTBEG=0., JJFIL=1 , TTFIN=61. , ITCRD=0
 $END
 $SEEDS
 $END
 $AGAIN
  LLSUP(1)=2,2,2,2,2,2,2,2,2,2,2,2,2,  ITCRD=13
 $END
```

3.6. BASE CASE DATA

THE FOLLOWING IS A SAMPLE INPUT DECK TO THE SUBPROGRAM INTLC.

```
NUNITS          29
NTYPES           1
ODAY            10.
KDAY            60
NMATE: NUMBER OF ROWS IN THE MAINTAINENCE LOOK-UP TABLE
NMATE           14
TABLE: SERIAL, TOTAL MAINTENANCE, CAPACITY (FOR EACH TYPE)
TABLE       29035.      2542.       .24
TABLE       29025.      2182.       .24
TABLE       29015.      1057.       .24
TABLE       29155.      0172.       .24
TABLE       29075.      0578.       .24
TABLE       29055.      0892.       .24
TABLE       29085.      0502.       .24
TABLE       29137.      0705.       .24
TABLE       29105.      0180.       .24
TABLE       29207.      0442.       .24
TABLE       29135.      0225.       .24
TABLE       29245.      0127.       .24
TABLE       29208.      0279.       .24
TABLE       29127.       0300.       .50
NCMRAT: NONCOMBAT LOSS RATE
NCMRAT        .01    .01
```

```
COMRAT: COMBAT LOSS RATE
COMRAT        .062    .062
PERRAT: PERSONNEL LOSS RATE
PERRAT         1.2     1.2
UNREP: UNREPAIRABLE LOSS RATE
UNREP          .05     .05
DAMRAT: PERMANENT DAMAGE RATE
DAMRAT         .36     .36
ABRAT: ABANDONMENT RATE
ABRAT          .024    .024
CRWLSR: PERMANENT CREW LOSS RATE
CRWLSR         .926    .926
PWRSHR: PREPARATION TIME: PWRS
PWRSHR        036.    036.
UNECRT: UNECONOMICALLY REPAIRABLE RATE
UNECRT         .17     .17
PWRS: INITIAL WAR RESERVES STOCK
PWRS         1131.   1131.
REPRAT: REPAIR RATES
REPRAT       1106.   1106.
REPRAT        0846.   0846.
PWRSRT:  WAR RESERVES OUTPUT IN MANHOURS PER DAY
PWRSRT       1586.   1586.
DLYSTA:  COMMITMENT DELAY:  ON STATION UNITS
DLYSTA          1.
DLYPOM:  COMMITMENT DELAY:  POMCUS UNITS
DLYPOM         10.
DLYCON:  COMMITMENT DELAY:  CONUS UNITS
DLYCON          8.
DLYHOS:  HOSPITAL RETURNS TO THEATER STOCKS DELAY
DLYHOS         16.
DLYSUP: SHIPMENTS TO UNIT FROM THEATER STOCKS DELAY (EQUIPMENT)
DLYSUP          4.
DLYPER: SHIPMENTS TO UNIT FROM THEATER STOCKS DELAY (PERSONNEL)
DLYPER          4.
DLYMAI: DELAY BEFORE MAINTAINENCE TS SET UP
DLYMAI          6.
DSNCM:  FRACTION OF DS NONCOMBAT LOSSES TREATED BY DS MAINTAINENCE UNITS
DSNCM         .86
DSCOM:  FRACTION OF DS COMBAT UNITS TREATED BY DS MAINTAINENCE UNITS
DSCOM         .76
MAFACT(1,J): AVERAGE DS MAINTAINENCE TIME FOR NONCOMBAT EQUIPMENT
MAFACT(1,J      7.          7.
MAFACT(2,J): AVERAGE GS MAINTAINENCE TIME FOR NONCOMBAT EQUIPMENT
MAFACT(2,J     65.         65.
MAFACT(3,J): AVERAGE DS MAINTAINENCE TIME FOR COMBAT EQUIPMENT
MAFACT(3,J     14.         14.
MAFACT(4,J): AVERAGE GS MAINTAINENCE TIME FOR COMBAT EQUIPMENT
MAFACT(4,J     69.         69.
CRWPER: CREW SIZES
```

```
CRWPER          4.   4.
THTRSM: UNIT ORIGIN, SERIAL NUMBER, ARRIVAL TIME(EXCEPT FOR ONSTATION UNIT
UNITAU(I,J,1): UNIT'S AUTHORIZED EQUIPMENT STRENGTH
UNITAU(I,J,2): UNIT'S AUTHORIZED EQUIPMENT STRENGTH
THTRSM          1.      29035.  1.
UNITAU(1)     360.
UNITAU(2)     1440.
THTRSM    1.          29035.    1.
UNITAU(1)     360.
UNITAU(2)     1440.
THTRSM    1.          29025.    1.
UNITAU(1)     306.
UNITAU(2)     1224.
THTRSM    1.          29025.    1.
UNITAU(1)     306.
UNITAU(2)     1224.
THTRSM    1.                     1.
UNITAU(1)     159.
UNITAU(2)     636.
THTRSM    1.                     1.
UNITAU(1)     159.
UNITAU(2)     636.
THTRSM    2.          29025.    2.
UNITAU(1)     306.
UNITAU(2)     1224.
THTRSM    2.                     2.
UNITAU(1)     159.
UNITAU(2)     636.
THTRSM    2.          29035.    3.
UNITAU(1)     360.
UNITAU(2)     1440.
THTRSM    2.          29025.    5.
UNITAU(1)   306.
UNITAU(2)   1224.
THTRSM    3.          29015.    21.
UNITAU(1)   120.
UNITAU(2)   480.
THTRSM    3.          29155.    23.
UNITAU(1)   0.
UNITAU(2)   0.
THTRSM    3.          29015.    23.
UNITAU(1)   66.
UNITAU(2)   264.
THTRSM    3.          29035.    25.
UNITAU(1)   360.
UNITAU(2)   1440.
THTRSM    3.                     28.
UNITAU(1)   174.
UNITAU(2)   696.
THTRSM    3.                     28.
```

```
UNITAU(1)   12.
UNITAU(2)   48.
THTRSM    3.          29075.    28.
UNITAU(1)   66.
UNITAU(2)   264.
THTRSM    3.          29055.    28.
UNITAU(1)   66.
UNITAU(2)   264.
THTRSM    3.          29075.    30.
UNITAU(1)   120.
UNITAU(2)   480.
THTRSM    3.          29015.    35.
UNITAU(1)   12.
UNITAU(2)   48.
THTRSM    3.          29085.    35.
UNITAU(1)   0.
UNITAU(2)   0.
THTRSM    3.          29025.    59.
UNITAU(1)   198.
UNITAU(2)   792.
THTRSM    3.          29025.    59.
UNITAU(1)   144.
UNITAU(2)   576.
THTRSM    3.          29075.    60.
UNITAU(1)   120.
UNITAU(2)   480.
THTRSM    3.          20135.    44.
UNITAU(1)   066.
UNITAU(2)   264.
THTRSM    3.          29075.    57.
UNITAU(1)   066.
UNITAU(2)   264.
THTRSM    3.          29135.    55.
UNITAU(1)   012.
UNITAU(2)   048.
THTRSM    3.          29075.    59.
UNITAU(1)   066.
UNITAU(2)   264.
THTRSM    3.          29075.    69.
UNITAU(1)   066.
UNITAU(2)   264.
NRFSUP: NUMBER OF WAR RESERVES RESUPPLY EVENTS
NRESUP          16
NRFSUP: TIME, QUANTITY, EQUIPMENT TYPE THAT RECEIVES RESUPPLY
NRESUP          32.       051.      1.
NRFSUP          36.       180.      1.
NRESUP          40.       180.      1.
NRFSUP          44.       180.      1.
NRFSUP          48.       180.      1.
NRFSUP          52.       180.      1.
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NRESUP          56.       180.       1.
NRESUP          60.        97.       1.
NRESUP          64.        20.       1.
NRESUP          68.        20.       1.
NRESUP          72.        20.       1.
NRESUP          76.        20.       1.
NRESUP          80.        20.       1.
NRESUP          84.        20.       1.
NRESUP          88.        20.       1.
NRESUP          92.        20.       1.
NREPL: NUMBER OF RESERVE REPLACEMENTPERSONNEL EVENTS RECEIVED BY THEATER
NREPL           23
NREPL: TIME, QUANTITY, EQUIPMENT TYPE THAT RECIEVES PERSONNEL
NREPL           4.        724.       1.
NREPL           8.        724.       1.
NREPL           12.       724.       1.
NREPL           16.       724.       1.
NREPL           20.       724.       1.
NREPL           24.       724.       1.
NREPL           28.       724.       1.
NREPL           32.       724.       1.
NREPL           36.       577.       1.
NREPL           40.       577.       1.
NREPL           44.       577.       1.
NREPL           48.       577.       1.
NREPL           52.       577.       1.
NREPL           56.       577.       1.
NREPL           60.       577.       1.
NREPL           64.       407.       1.
NREPL           68.       407.       1.
NREPL           72.       407.       1.
NREPL           78.       407.       1.
NREPL           82.       407.       1.
NREPL           84.       407.       1.
NREPL           88.       407.       1.
NREPL           92.       407.       1.
NARRMS:  NUMBER OF ARRIVALS OF MAINTAINENCE AND RESUPPLY UNITS
NARRMS          69
NARRMS:  TYPE,TIME,SERIAL,INCREASE IN CAPACITY, EQUIPMENT TYPE
NARRMS          4.        02.       29207.     106.       1.
NARRMS          4.        15.       29207.     106.       1.
NARRMS          4.        15.       29207.     106.       1.
NARRMS          4.        17.       29207.     106.       1.
NARRMS          4.        29.       29207.     106.       1.
NARRMS          4.        30.       29207.     106.       1.
NARRMS          4.        30.       29207.     106.       1.
NARRMS          4.        32.       29207.     106.       1.
NARRMS          4.        33.       29207.     105.       1.
NARRMS          4.        35.       29207.     106.       1.
NARRMS          4.        36.       29207.     106.       1.
```

NARRMS	4.	37.	29207.	106.	1.
NARRMS	4.	37.	29207.	106.	1.
NARRMS	4.	42.	29207.	106.	1.
NARRMS	4.	43.	29207.	106.	1.
NARRMS	4.	45.	29207.	106.	1.
NARRMS	4.	49.	29207.	106.	1.
NARRMS	4.	49.	29207.	106.	1.
NARRMS	4.	51.	29207.	106.	1.
NARRMS	4.	56.	29207.	108.	1.
NARRMS	4.	71.	29207.	106.	1.
NARRMS	4.	74.	29207.	106.	1.
NARRMS	4.	77.	29207.	106.	1.
NARRMS	4.	78.	29207.	106.	1.
NARRMS	4.	78.	29207.	106.	1.
NARRMS	4.	79.	29207.	106.	1.
NARRMS	4.	85.	29207.	106.	1.
NARRMS	4.	87.	29207.	106.	1.
NARRMS	4.	102.	29207.	106.	1.
NARRMS	4.	107.	29207.	106.	1.
NARRMS	4.	113.	29207.	106.	1.
NARRMS	4.	114.	29207.	106.	1.
NARRMS	5.	17.	29208.	067.	1.
NARRMS	5.	20.	29208.	067.	1.
NARRMS	5.	21.	29208.	067.	1.
NARRMS	5.	48.	29208.	067.	1.
NARRMS	5.	50.	29208.	067.	1.
NARRMS	5.	52.	29209.	067.	1.
NARRMS	5.	70.	29208.	067.	1.
NARRMS	5.	70.	29209.	067.	1.
NARRMS	5.	75.	29209.	067.	1.
NARRMS	5.	175.	29208.	067.	1.
NARRMS	5.	175.	29209.	067.	1.
NARRMS	5.	175.	29208.	067.	1.
NARRMS	5.	175.	29209.	067.	1.
NARRMS	5.	21.	29137.	169.	1.
NARRMS	5.	21.	29137.	169.	1.
NARRMS	5.	24.	29137.	169.	1.
NARRMS	5.	27.	29137.	169.	1.
NARRMS	5.	33.	29137.	169.	1.
NARRMS	5.	33.	29137.	169.	1.
NARRMS	5.	33.	29137.	169.	1.
NARRMS	5.	38.	29137.	169.	1.
NARRMS	5.	45.	29137.	169.	1.
NARRMS	5.	51.	29137.	169.	1.
NARRMS	5.	52.	29137.	169.	1.
NARRMS	5.	65.	29137.	169.	1.
NARRMS	5.	69.	29137.	169.	1.
NARRMS	5.	73.	29137.	169.	1.
NARRMS	5.	79.	29137.	169.	1.
NARRMS	5.	85.	29137.	169.	1.

NARRMS	5.	88.	29137.	169.	1.	
NARRMS	5.	90.	29137.	169.	1.	
NARRMS	6.	30.	29127.	300.	1.	
NARRMS	6.	47.	29127.	300.	1.	
NARRMS	6.	51.	29127.	300.	1.	
NARRMS	6.	76.	29127.	300.	1.	
REDEPLOY	1.0	1.0	30.0	2.0	1.0	4.0
GSU RESV	5.0	0.0	6.0	2.0	1.0	1.0

4. APPENDIX A LIST; @2ADD.

```
@6 8UOM.SUSPEND
@USE X.,UNCLASSIFIED,@2X@T.
@USE @.,82@ASP.
@USE I.,82IG.
@USE R.,82RUNS.
@USE M.,82MASTERFILE.
@USE U.,82UPDATE.
@USE RD.,82MASTER@RD.
@USE 6.,68UOM.
@COPY,A 68UOM.SUSPEND
@COPY,A 68UOM.RESUME
@COPY,A 82MASTERFILE.MASTERFILE,TPF@.MASTERFILE
@ADD 64MACLIB.MACRO
@COPY,A @.EDIT,TPF@.EDIT
@6 8UOM.RESUME,D
```

APPENDIX G

BALFOR Simulation Documentation

INTRODUCTION. The purpose of Appendix G is to present the listing of the BALFOR simulation programs and subroutines, the flow diagrams of selected subroutines and a list of the computer variables used in the BALFOR simulation programs. Section I contains the computer listings of routines and subroutines in alphabetical order. Section II contains flow diagrams of routines and subroutines and the flow diagrams also appear in alphabetical sequence. Section III contains definitions of the FORTRAN variables which appear in the computer listings and flow diagrams.

```
****** ARRIVL ******

000001       09          SUBROUTINE ARRIVL
000002       09          INCLUDE COMMON.LIST
000003       09    C
000004       09    C SUBROUTINE ARRIVAL HANDLES THE ARRIVAL OF UNIT INTO THE THEATER. PERSONNEL
000005       09    C AND EQUIPMENT ARE MOVED INTO A UNIT'S ON HAND STRENGTH FILE. IN ADDITION THE
000006       09    C UNIT'S COMMITMENT IS SCHEDULED
000007       09    C
000008       13    C$     WRITE (13, 1971)TNOW
000009       09     1971 FORMAT (' ****SUBROUTINE ARRIVL CALLED AT ',F10.1,' *****')
000010       09    C
000011       09          N=IFIX(ATRIB(3))
000012       09          ATRIB(2)=3.0
000013       09          DO 400 I=1,NTYPES
000014       09          UNITOH(N,I,1)=AUNITAU(N,I,1)
000015       09      400 UNITOH(N,I,2)=AUNITAU(N,I,2)
000016       09    C
000017       09    C  CHANGE THE UNIT'S STATUS TO UNCOMMITTED
000018       09    C
000019       09          THTRSM(N,1)=1.0
000020       09          ATRIB(1)=TNOW+DLYCON
000021       09          IF(THTRSM(N,2).EQ.2.0)ATRIB(1)=DLYPOM+TNOW
000022       09    C
000023       09    C  THE COMMITMENT OF THE UNIT HAS BEEN SCHEDULED. IF THTRSM(N,2) IS 2.0 THE
000024       09    C  UNIT IS A POMCUS UNIT, OTHERWISE IT IS A CONUS UNIT
000025       09    C
000026       09          CALL FILEM(1)
000027       09    C
000028       09    C INCREASE DS MAINTENANCE FOR ARRIVING COMBAT UNIT
000029       09    C FIRST DO TABLE LOOK UP FOR VALUE
000030       09    C
000031       09          DO 500 I=1,NMATE
000032       09      500 IF(THTRSM(N,3).EQ.MACAPT(I,1))   GO TO 510
000033       13    C$     WRITE (13,505) ATRIB(3)
000034       09      505 FORMAT(1X,'UNIT NUMBER',F5.0,' HAS NO DS MAINTENANCE SUPPORT')
000035       09          RETURN
000036       09    C
000037       09    C SCHEDULE THE ARRIVAL OF ADDITIONAL MAINTENANCE (DS MAINTENANCE)
000038       09    C
000039       09      510 ATRIB(1)=TNOW + DLYMAI
000040       12          ATRIB(2)=9.0
000041       12          ATRIB(3)=N
000042       12          ATRIB(4)=I
000043       09      520 CALL FILEM(1)
000044       09          RETURN
000045       09          END


****** ARRIVL ******
```

```
 ****** CHECK  ******
000001       36          SUBROUTINE CHECK(II)
000002       36          INCLUDE COMMON.LIST
000003       36          COMMON /BCOM5/ IIENT,IISEED(6),JJBEG,JJCLR,MMNIT,MMON,MNAME(3),MNCF BCOM5  1
000004       36         1I,MNDAY,MMPT,MNSET,MMPRJ,MMPRM,MNRMS,MNRUN,MNSTR,MNYR,SSEED(6)     BCOM5  2
000005       36          GO TO(1111,2222),II
000006       36    C
000007       36    C VARIABLE DICTIONARY
000008       36    C
000009       36    C SUPTOT(J)- THE RESUPPLY TOTAL
000010       36    C
000011       36    C WARRES(J)- THE INITIAL WAR RESERVES
000012       36    C
000013       36    C UNDSIN(J) - THE TOTAL INPUT TO UNIT DS
000014       36    C
000015       36    C RDSIN(J) - THE TOTAL INPUT TO REAR DS
000016       36    C
000017       36    C TGSIN(J) - THE TOTAL INPUT TO GS
000018       36    C
000019       36    C PERARR(J) - TOTAL REPLACEMENT PERSONNEL ARRIVED
000020       36    C
000021       36    C OTUNDS(J)- THE CUMMULATIVE UNIT DS TOTAL
000022       36    C
000023       36    C OTRDS(J) - CUMMULATIVE REAR DS TOTAL
000024       36    C
000025       36    C OTGS(J)  - CUMMULATIVE GS TOTAL
000026       36    C
000027       36    C HOSP(J)  - HOSPITALIZED PERSONNEL TOTAL
000028       36    C
000029       36    C PTRANS(J)- PERSONNEL IN TRANSIT
000030       36    C
000031       39    C QCAP(X,IDAY,TYPE)- THE CAPACITY OF DS, GS, AND PWRMS MAINTENANCE QUEUES,
000032       36    C FOR X=1,2, AND 3, RESPECTIVELY.
000033       37    C SEE COMMENTS JUST BEFORE LINE 1930 FOR MORE EXPLICIT INFORMATION.
000034       36    C
000035       36     1111 IDAY=TNOW
000036       36          IF(IDAY.EQ.0)IDAY=1
000037       36          DO 1000 J=1,MTYPES
000038       36          DO 900 I=1,NUNITS
000039       36          IF(TMTRSN(I,1).LT.1.0)GO TO 900
000040       36          IN(1,IDAY,J)=IN(1,IDAY,J)+UNITAU(I,J,1)
000041       36          IN(7,IDAY,J)=IN(7,IDAY,J)+UNITAU(I,J,2)
000042       36    C
000043       36    C COMPUTE AUTHORIZE EQUIPMENT AND PERSONNEL STRENGTH TODATE
000044       36    C
000045       36      900 CONTINUE
000046       36          IN(2,IDAY,J)=SUPTOT(J)
000047       36    C
000048       36    C CUMULATIVE RESUPPLY TOTAL TODATE
000049       36    C
000050       36          IN(3,IDAY,J)=WARRES(J)
000051       36    C
000052       36    C INITIAL WAR RESERVES
000053       36    C
000054       36          IN(4,IDAY,J)=UNDSIN(J)
000055       36    C
000056       36    C UNIT DS INPUT TOTAL
000057       36    C
000058       36          IN(5,IDAY,J)=RDSIN(J)
000059       36    C
000060       36    C REAR DS INPUT TOTAL
000061       36    C
000062       36          IN(6,IDAY,J)=TGSIN(J)
000063       36    C
000064       36    C GS INPUT TOTAL
000065       36    C
000066       36          IN(8,IDAY,J)=PERARR(J)
000067       36    C
000068       36    C REPLACEMENT PERSONNEL TOTAL TODATE
000069       36    C
000070       36          IN(9,IDAY,J)=IN(1,IDAY,J)+IN(2,IDAY,J)+IN(3,IDAY,J)
000071       36          IN(10,IDAY,J)=IN(4,IDAY,J)+IN(5,IDAY,J)+IN(6,IDAY,J)
000072       36          IN(11,IDAY,J)=IN(7,IDAY,J)+IN(8,IDAY,J)
000073       36    C
000074       36    C COMPUTE TOTALS FOR EQUIPMENT, MAINTENANCE AND PERSONNEL
000075       36    C
000076       36     1000 CONTINUE
000077       36          DO 2000 J=1,MTYPES
000078       36          OUT(1,IDAY,J)=PWRS(J)
000079       36    C
000080       36    C THE CURRENT TOTAL IN WAR RESERVES
000081       36    C
000082       36          OUT(2,IDAY,J)=TSTOCK(1,J)+TSTOCK(2,J)
000083       36    C
000084       36    C THE TOTAL EQUIPMENT IN THEATER STOCKS
000085       36    C
 ****** CHECK  ******
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****** CHECK ******

000086       36          DO 1900 I=1,NUNITS
000087       36          IF(THTRSM(I,1).EQ.1.0) OUT(3,IDAY,J)=OUT(3,IDAY,J)+UNITON(I,J,1)
000088       36    C
000089       36    C COMPUTE UNCOMMITTED IN THEATER EQUIPMENT TOTAL
000090       36    C
000091       36          IF(THTRSM(I,1).EQ.1.0) OUT(14,IDAY,J)=OUT(14,IDAY,J)+UNITON(I,J,2)
000092       36    C
000093       36    C COMPUTE PERSONNEL IN COMBAT UNITS TOTAL
000094       36    C
000095       36          IF(THTRSM(I,1).EQ.2.0) OUT(4,IDAY,J)=OUT(4,IDAY,J)+UNITON(I,J,1)
000096       36    C
000097       36    C COMPUTE COMMITTED EQUIPMENT TOTAL
000098       36    C
000099       36          IF(THTRSM(I,1).EQ.2.0) OUT(14,IDAY,J)=OUT(14,IDAY,J)+UNITON(I,J,2)
000100       36    C
000101       36    C COMPUTE PERSONNEL IN COMBAT UNITS TOTAL
000102       36    C
000103       36          OUT(8,IDAY,J)=MCC1(I,J,1,1)+MCC1(I,J,1,2)+OUT(8,IDAY,J)
000104       36    C
000105       36    C COMPUTE AMOUNT IN UNIT DS MAINTENANCE
000106       36    C
000107       36     1900 CONTINUE
000108       36          OUT(5,IDAY,J)=PRMLOS(J)
000109       36    C
000110       36    C PERMANENT EQUIPMENT LOSSES
000111       36    C
000112       36          OUT(6,IDAY,J)=UNECON(J)
000113       36    C
000114       36    C UNECONOMICALLY REPAIRABLE
000115       36    C
000116       36          OUT(7,IDAY,J)=TRANST(J)
000117       36    C
000118       36    C EQUIPMENT IN TRANSIT
000119       36    C
000120       36          OUT(9,IDAY,J)=MCC2(1,1,J)+MCC2(3,1,J)
000121       36    C
000122       36    C REAR DS MAINTENANCE QUEUE LENGTH
000123       36    C
000124       36          OUT(10,IDAY,J)=MCC2(2,1,J)+MCC2(4,1,J)
000125       36    C
000126       36    C GS MAINTENANCE QUEUE LENGTH
000127       36    C
000128       36          OUT(11,IDAY,J)=QTUNDS(J)
000129       36    C
000130       36    C TOTAL OUTPUT OF UNIT DS MAINTENANCE
000131       36    C
000132       36          OUT(12,IDAY,J)=QTRDS(J)
000133       36    C
000134       36    CTOTAL OUTPUT OF REAR DS MAINTENANCE
000135       36    C
000136       36          OUT(13,IDAY,J)=QTGS(J)
000137       36    C
000138       36    C TOTAL OUTPUT OF GS MAINTENANCE
000139       36    C
000140       36          OUT(15,IDAY,J)=PERLOS(J)
000141       36    C
000142       36    C PERMANENTLY LOST PERSONNEL TOTAL
000143       36    C
000144       36          OUT(16,IDAY,J)=HOSP(J)
000145       36    C
000146       36    C HOSPITALIZED PERSONNEL
000147       36    C
000148       36          OUT(17,IDAY,J)=TPERS(1,J)+TPERS(2,J)
000149       36    C
000150       36    C COMPUTE THE THEATER PERSONNEL POOL
000151       36    C
000152       36          OUT(18,IDAY,J)=PTH[illegible](J)
000153       36    C
000154       36    C PERSONNEL IN TRANSIT TO THE UNITS
000155       36    C
000156       36          DO 1910 II=1,10
000157       36          OUT(19,IDAY,J)=OUT(19,IDAY,J)+OUT(II,IDAY,J)
000158       36    C
000159       36    C COMPUTE EQUIPMENT TOTAL
000160       36    C
000161       36     1910 CONTINUE
000162       36          DO 1920 II=8,13
000163       36          OUT(20,IDAY,J)=OUT(20,IDAY,J)+OUT(II,IDAY,J)
000164       36    C

****** CHECK ******
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 ****** CHECK  ******

000165       36   C COMPUTE MAINTENANCE TOTAL
000166       36   C
000167       36    1920 CONTINUE
000168       36         DO 1930 II=14,18
000169       36         OUT(21,IDAY,J)=OUT(21,IDAY,J)+OUT(II,IDAY,J)
000170       36   C
000171       36   C COMPUTE THE PERSONNEL TOTAL
000172       36   C
000173       36   C COMPUTE OS, GS, PWRMS MAINTENANCE QUEUE CAPACITIES.
000174       40         QCAP(1,IDAY,J) = REPRAT(1,J)    8OS CAPACITY
000175       40         QCAP(2,IDAY,J) = REPRAT(2,J)    8GS CAPACITY
000176       40         QCAP(3,IDAY,J) = PWRSRT(J)      8PWRMS CAPACITY
000177       36   C
000178       36    1930 CONTINUE
000179       36    2000 CONTINUE
000180       36         RETURN
000181       36   C
000182       36   C READ ARRAY VALUES AND PRINT IN THE OUTPUT REPORT.
000183       36   C
000184       36   C PRINT ONE REPORT FOR EACH EQUIPMENT TYPE
000185       36    2222      DO 2 KTYPE = 1,NTYPES
000186       36   C
000187       36   C PRINT 10 DAYS ON EACH PAGE.
000188       36              DO 3 NDAY = 1,KDAY,10
000189       36   C
000190       36   C HOME PRINTER AND PRINT HEADING.
000191       36              NSTOP = NDAY + 9
000192       36         PRINT 100,KTYPE,KNRUN,NDAY,NSTOP,(I,I=NDAY,NSTOP)
000193       36   C
000194       36   C PRINT EQUIPTMENT INPUTS
000195       38              PRINT 110, ((IN(N,I,KTYPE),I=NDAY,NSTOP),N=1,3)
000196       36   C
000197       36   C PRINT MAINTENANCE INPUTS
000198       38              PRINT 120, ((IN(N,I,KTYPE),I=NDAY,NSTOP),N=4,6)
000199       36   C
000200       36   C PRINT PERSONNEL INPUTS
000201       38              PRINT 130, ((IN(N,I,KTYPE),I=NDAY,NSTOP),N=7,8)
000202       36   C
000203       36   C PRINT INPUT TOTALS
000204       36   C
000205       38              PRINT 135, ((IN(N,I,KTYPE),I=NDAY,NSTOP),N=9,11)
000206       36   C  PRINT DIFFERENCE BETWEEN INPUT AND OUTPUT TOTALS :
000207       36   C        C  DELTA = ABS(IN - OUT)  ]
000208       36         DO 4 I=1,3
000209       36         IIN=I+8
000210       36         IOUT=I+18
000211       36         DO  4 J=NDAY,NSTOP
000212       39         DELTA (I,J,KTYPE) = ABS( IN(IIN,J,KTYPE) - OUT(IOUT,J,KTYPE))
000213       36    4    CONTINUE
000214       38         PRINT 170 ((DELTA (N,I,KTYPE), I=NDAY,NSTOP),N=1,3)
000215       36   C
000216       36   C PRINT MAINTENANCE QUEUE CAPACITIES
000217       38         PRINT 180,((QCAP(N,I,KTYPE),I=NDAY,NSTOP),N=1,3)
000218       36   C
000219       36   C  PRINT OUTPUTS
000220       36   C
000221       36   C
000222       36   C  PRINT EQUIPMENT OUTPUT
000223       38         PRINT 140, ((OUT (N,I,KTYPE), I=NDAY,NSTOP),N=1,10)
000224       36   C
000225       36   C  PRINT MAINTENANCE OUTPUT
000226       38         PRINT 150, ((OUT (N,I,KTYPE), I=NDAY,NSTOP),N=8,13)
000227       36   C
000228       36   C  PRINT PERSONNEL OUTPUT
000229       38         PRINT 160, ((OUT (N,I,KTYPE), I=NDAY,NSTOP),N=16,18)
000230       36   C
000231       36   C  PRINT TOTALS OF OUTPUT
000232       38         PRINT 165,((OUT(N,I,KTYPE),I=NDAY,NSTOP), N=19,21)
000233       36   C
000234       36   C CONTINUE REMAINING DAYS ON ANOTHER PAGE.
000235       36    3         CONTINUE
000236       36    2         CONTINUE
000237       36         RETURN
000238       36   100   FORMAT ('1  EQUIPMENT TYPE ',I2,30X,'RUN NUMBER ',I2,T115,'DAYS
000239       36        +',I2,' TO ',I2,//,
000240       36        +'   DAY-------------->',T30,10(5X,I2,3X),/,
000241       36        +130('-'))

 ****** CHECK  ******
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 ****** CHECK ******

000242      36   C
000243      36    110  FORMAT (' ',T55,'I',T65,'M',T75,'P',T85,'U',
000244      36        +,T95,'T',T105,'S',
000245      36        +T131,'0',T131,'0',/,132('0'),/,
000246      36        +' ' A) EQUIPMENT:',T131,'0',/,' ',
000247      36        +5X,'1) AUTHORIZED IN UNITS',T30,10E10.4,' ',/,' ',
000248      36        +5X,'2) RESUPPLY',T30,10E10.4,' ',/,' ',
000249      36        +5X,'3) WAR RESERVES',T30,10E10.4,' ')
000250      36   C
000251      36    120  FORMAT (' ' B) MAINTENANCE:',T131,'0',/,' ',
000252      36        +5X,'1) UNIT DS',T30,10E10.4,' ',/,' ',
000253      36        +5X,'2) REAR DS',T30,10E10.4,' ',/,' ',
000254      36        +5X,'3) GS',T30,10E10.4,' ')
000255      36   C
000256      36    130  FORMAT (' ' C) PERSONNEL:',T131,'0',/,' ',
000257      36        +5X,'1) AUTHORIZED',T30,10E10.4,' ',/,' ',
000258      36        +5X,'2) REPLACEMENTS',T30,10E10.4,' ')
000259      36   C
000260      36    135  FORMAT (130('0'),/,' ' TOTALS OF INPUTS:',T131,'0',
000261      36        +/,' ',5X,'A) EQUIPMENT',T30,10E10.4,' ',/,
000262      36        +' ',5X,'B) MAINTENANCE',T30,10E10.4,' ',/,
000263      36        +' ',5X,'C) PERSONNEL',T30,10E10.4,' ')
000264      36   C
000265      36    140  FORMAT ('1',//////,130('0'),/,
000266      36        +' ',T55,'O',T65,'U',T75,'T',T85,'P',T95,'U',T105,'T',T131,'0'
000267      36        +,/,131('0'),/,
000268      36        +' ' A) EQUIPMENT',T131,'0',/,' ',5X,'1) WAR RESERVES',
000269      36        +T30,10E10.4,' ',/,' ',
000270      36        +5X,'2) THEATER STOCKS',T30,10E10.4,' ',/,' ',
000271      36        +5X,'3) ARRIVED, NOT COMMITTED',T30,10E10.4,' ',/,' ',
000272      36        +5X,'4) COMMITTED',
000273      36        +T30,10E10.4,' ',/,' ',
000274      36        +5X,'5) PERMANENT LOSSES',
000275      36        +T30,10E10.4,' ',/,' ',
000276      36        +5X,'6) UNECONOMICALLY REPAIRABLE',
000277      36        +T30,10E10.4,' ',/,' ',
000278      36        +5X,'7) IN TRANSIT',
000279      36        +T30,10E10.4,' ',/,' ',
000280      36        +5X,'8) DIV MAINTENANCE',
000281      36        +T30,10E10.4,' ',/,' ',
000282      36        +5X,'9) REAR DS MAINT',T30,10E10.4,' ',/,' ',
000283      36        +5X,'10) GS MAINTENANCE',T30,10E10.4,' ')
000284      36   C
000285      36    150  FORMAT (' ' B) MAINTENANCE:',T131,'0',/,' ',
000286      36        +5X,'1) IN DIV MAINT',T30,10E10.4,' ',/,' ',
000287      36        +5X,'2) IN REAR DS MAINT',T30,10E10.4,' ',/,' ',
000288      36        +5X,'3) IN GS MAINT',T30,10E10.4,' ',/,' ',
000289      36        +5X,'4) DIV MAINT OUTPUT',T30,10E10.4,' ',/,' ',
000290      36        +5X,'5) REAR DS MAINT OUTPUT',T30,10E10.4,' ',/,' ',
000291      36        +5X,'6) GS MAINT OUTPUT',T30,10E10.4,' ')
000292      36   C
000293      36    160  FORMAT (' ' C) PERSONNEL:',T131('0'),/,' ',
000294      36        +5X,'1) TOTAL IN COMBAT UNITS',    T30,10E10.4,' ',/,' ',
000295      36        +5X,'2) PERMANENT LOSSES',T30,10E10.4,' ',/,' ',
000296      36        +5X,'3) IN HOSPITAL',T30,10E10.4,' ',/,' ',
000297      36        +5X,'4) THEATER POOL, NO EQUIPMENT',T30,10E10.4,' ',/,' ',
000298      36        +5X,'5) IN TRANSIT',T30,10E10.4,' ')
000299      36   C
000300      36    165  FORMAT (131('0'),/,' ' TOTALS OF OUTPUTS:',T131,'0',
000301      36        +,/,' ',5X,'A) EQUIPMENT',T30,10E10.4,' ',/,' ',
000302      36        +5X,'B) MAINTENANCE',T30,10E10.4,' ',/,' ',
000303      36        +5X,'C) PERSONNEL',T30,10E10.4,' ',/,131('0'))
000304      36   C
000305      36    170  FORMAT (130('0'),/////,130('0'),/,' ',43X,
000306      36        +'DISCREPANCIES BETWEEN INPUTS AND OUTPUTS:',T131,'0',/,130('0'),
000307      36        +,/,' ',5X,
000308      36        +'A) EQUIPMENT',T30,10E10.4,' ',/,' ',5X,'B) MAINTENANCE',
000309      36        +T30,10E10.4,' ',/,' ',5X,'C) PERSONNEL',T30,10E10.4,' ',
000310      36        +/,130('0'))
000311      36   C
000312      36    180  FORMAT ////////,131('0'),/,' ',43X,'DS, GS, AND PWRMS '
000313      36        +'MAINTENANCE CAPACITIES',T131,'0',/,131('0'),/,' ',5X,
000314      36        +'UNIT DS',T30,10E10.4,' ',/,
000315      36        +' ',5X,'REAR DS',T30,10E10.4,' ',/,
000316      36        +' ',5X,'PWRMS',T30,10E10.4,' ',/,131('0'))
000317      36   C
000318      36         END

****** CHECK ******
```

```
      ****** COMMIT ******

@ELT,L B28ACKUP-9.COMMIT
ELT007 S73R1A 03/21/79 07:54:58 (5.)
000001       01         SUBROUTINE COMMIT
000002       01         INCLUDE COMMON.LIST
000003       05    C$     WRITE (13, 1971)TNOW
000004       01     1971 FORMAT (' ****SUBROUTINE COMMIT CALLED AT ',F10.1,' *****')
000005       01    C
000006       01    C SUBROUTINE COMMIT WILL COMMIT A COMBAT UNIT TO THE FEBA
000007       01    C
000008       01           N=IFIX(ATRIB(3))
000009       02           TNTRSM(N,1)=2.0
000010       01           RETURN
000011       01           END


      ****** COMMIT ******
```

```
****** DATIN-DATA ******

000001        56    $GENERAL
000002        60     NNAME(1)=6HSSIPL ,6H LEVEL ,6H-9      ,
000003        56     NNPRJ=9002, NNRNS=1, LLSUP(4)=2.2, LLSUP(9)=2.2, LLSUP(12)=2.0.1
000004        56    $END
000005        56    $STATIS
000006        56     NNCLT=12, NNPLT=5
000007        56    $END
000008        56    $LIMITS
000009        56     NNSTR=1, NNTRY=500, NNATR=7, NNFIL=1, NNSET=10000
000010        56    $END
000011        56    $COLCT
000012        56     I=1,  LLABC(1,1) = 6HPRMNEN, 6HT LOSS
000013        56    $END
000014        56    $COLCT
000015        56     I=2,  LLABC(2,1) = 6HTHEATR, 6H STOCK
000016        56    $END
000017        56    $COLCT
000018        56     I=3,  LLABC(3,1) = 6HWAR RE, 6HSERVES
000019        56    $END
000020        56    $COLCT
000021        56     I=4,  LLABC(4,1) = 6HAUTH S, 6HTRENGT
000022        56    $END
000023        56    $COLCT
000024        56     I=5,  LLABC(5,1) = 6HCOMMIT, 6HTED UN
000025        56    $END
000026        56    $COLCT
000027        56     I=6,  LLABC(6,1) = 6HMAINT , 6HRETURN
000028        56    $END
000029        56    $COLCT
000030        56     I=7,  LLABC(7,1) = 6HUNECON, 6HOM FIX
000031        56    $END
000032        56    $COLCT
000033        56     I=8,  LLABC(8,1) = 6HONSTAT, 6HION UN
000034        56    $END
000035        56    $COLCT
000036        56     I=9,  LLABC(9,1) = 6HPOMCUS, 6H UNITS
000037        56    $END
000038        56    $COLCT
000039        56     I=10, LLABC(10,1) = 6HCONUS , 6HUNITS
000040        56    $END
000041        56    $COLCT
000042        56     I=11, LLABC(11,1) = 6HUNIT A, 6HRRIVED
000043        56    $END
000044        56    $COLCT
000045        56     I=12, LLABC(12,1) = 6HCOMMIT, 6HTED UN
000046        56    $END
000047        56    $PLOT
000048        56     I=1, LLABP(11,1) = 6HTIME, LLABP(11,2)=1H , IITAP(1)=2, NNVAR(1)=7,
000049        56     LLPLT=2
000050        56      DTPLT(1)=0.5
000051        56    $END
000052        56    $PLTVAR
000053        56     IJ=1,  LLSYM(1)=1HP, LLABP(1,1)=6HPRMNEN, 6HT LOSS,
000054        56      LLPLO(1)=1, LLPMI(1)=2, PPMI(1)=1.0,
000055        56    $END
000056        56    $PLTVAR
000057        56     IJ=2,  LLSYM(2)=1HT, LLABP(2,1)=6HTHEATR, 6H STOCK,
000058        56      LLPLO(2)=1, LLPMI(2)=2, PPMI(2)=1.0,
000059        56    $END
000060        56    $PLTVAR
000061        56     IJ=3,  LLSYM(3)=1HR, LLABP(3,1)=6HWAR RE, 6HSERVES,
000062        56      LLPLO(3)=1, LLPMI(3)=2, PPMI(3)=1.0,
000063        56    $END
000064        56    $PLTVAR
000065        56     IJ=4,  LLSYM(4)=1HA, LLABP(4,1)=6HAUTH S, 6HTRENGT,
000066        56      LLPLO(4)=1, LLPMI(4)=2, PPMI(4)=1.0,
000067        56    $END
000068        56    $PLTVAR
000069        56     IJ=5,  LLSYM(5)=1HC, LLABP(5,1)=6HCOMMIT, 6HTED UN,
000070        56      LLPLO(5)=1, LLPMI(5)=2, PPMI(5)=1.0,
000071        56    $END
000072        56    $PLTVAR
000073        56     IJ=6,  LLSYM(6)=1HU, LLABP(6,1)=6HUNEC  , 6HREPAIR,
000074        56      LLPLO(6)=1, LLPMI(6)=2, PPMI(6)=1.0,
000075        56    $END
000076        56    $PLTVAR
000077        56     IJ=7,  LLSYM(7)=1HS, LLABP(7,1)=6HIN TRA, 6HNSIT  ,
000078        56      LLPLO(7)=1, LLPMI(7)=2, PPMI(7)=1.0,
000079        56    $END

****** DATIN-DATA ******
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```
****** DATIN-DATA ******

000080        56     $PLOT
000081        56      I=2, LLABP(11,1) = 6HTIME, IITAP(2)=3, NNVAR(2)=5, LLPLT=2,
000082        58      I=2, LLABP(11,1) = 6HTIME, LLABP(11,2)=1H , IITAP(2)=3, NNVAR(2)=6,
000083        56      LLPLT=2
000084        56       DTPLT(1)=0.5
000085        56     $END
000086        56     $PLTVAR
000087        56      IJ=1, LLSYM(1)=1HO, LLABP(1,1)=6HONSTAT, 6HION UN,
000088        56       LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
000089        56     $END
000090        56     $PLTVAR
000091        56      IJ=2, LLSYM(2)=1HP, LLABP(2,1)=6HPORCUS, 6H UNITS,
000092        56       LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=20.
000093        56     $END
000094        56     $PLTVAR
000095        56      IJ=3, LLSYM(3)=1HK, LLABP(3,1)=6HCONUS , 6H UNITS,
000096        56       LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=20.
000097        56     $END
000098        56     $PLTVAR
000099        58      IJ=4, LLSYM(4)=1HA, LLABP(4,1)=6HUNCOMM, 6HITTED ,
000100        56       LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=20.
000101        56     $END
000102        56     $PLTVAR
000103        56      IJ=5, LLSYM(5)=1HC, LLABP(5,1)=6HCOMMIT, 6HTED UN,
000104        56       LLPLO(5)=1, LLPHI(5)=2, PPHI(5)=20.
000105        56     $END
000106        58     $PLTVAR
000107        58      IJ=6, LLSYM(6)=1HT, LLABP(6,1)=6HCOMMIT, 6HTED   ,
000108        58       LLPLO(6)=1, LLPHI(6)=2, PPHI(6)=20.
000109        58     $END
000110        56     $PLOT
000111        56      I=3, LLABP(11,1) = 6HTIME, LLABP(11,2)=1H , IITAP(3)=4, NNVAR(3)=4,
000112        56      LLPLT=2,
000113        56       DTPLT(1)=0.5
000114        56     $END
000115        56     $PLTVAR
000116        56      IJ=1, LLSYM(1)=1HP, LLABP(1,1)=6HPRMNEN, 6HT LOSS,
000117        56       LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
000118        66     $END
000119        56     $PLTVAR
000120        56      IJ=2, LLSYM(2)=1HT, LLABP(2,1)=6HTEMPRA, 6HRY LOS,
000121        56       LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=20.
000122        56     $END
000123        56     $PLTVAR
000124        56      IJ=3, LLSYM(3)=1HM, LLABP(3,1)=6HMAINT , 6HRETURN,
000125        56       LLPLO(1)=1, LLPHI(1)=2, PPHI(3)=20.
000126        56     $END
000127        56     $PLTVAR
000128        56      IJ=4, LLSYM(4)=1HR, LLABP(4,1)=6HPWRS R, 6HESERVE,
000129        56       LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=20.
000130        56     $END
000131        56     $PLOT
000132        59      I=4, LLABP(11,1) = 6HTIME, LLABP(11,2)=1H , IITAP(4)=7, NNVAR(4)=4,
000133        56       LLPLT=2
000134        56       DTPLT(1)=0.5
000135        56     $END
000136        56     $PLTVAR
000137        56      IJ=1, LLSYM(1)=1HT, LLABP(1,1)=6HTK FRO, 6HM TMSK,
000138        56       LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=200.
000139        56     $END
000140        56     $PLTVAR
000141        56      IJ=2, LLSYM(2)=1HN, LLABP(2,1)=6HTK W/M, 6HD CREW,
000142        56       LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=200.
000143        56     $END
000144        56     $PLTVAR
000145        56      IJ=3, LLSYM(3)=1HC, LLABP(3,1)=6HAVAIL  , 6HCREW/6,
000146        56       LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=200.
000147        56     $END
000148        59     $PLTVAR
000149        59      IJ=4, LLSYM(4)=1HB, LLABP(4,1)=6HBACKLO , 6HB SUP ,
000150        59       LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=200.
000151        59     $END
000152        56     $PLOT
000153        56      I=5, LLABP(11,1) = 6HTIME, LLABP(11,2)=1H , IITAP(5)= 9, NNVAR(5)=3,
000154        56      LLPLT=2,
000155        56       DTPLT(1)=0.5
000156        56     $END
000157        56     $PLTVAR
000158        58      IJ=1, LLSYM(1)=1HO, LLABP(1,1)=6HDIV MA, 6HINT  0,
000159        56       LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
000160        56     $END
000161        56     $PLTVAR
000162        56      IJ=2, LLSYM(2)=1HD,  LLABP(2,1)=6HDS  MA,6HINT  0,
000163        56       LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=150.
000164        56     $END

****** DATIN-DATA ******
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```
******  DATIN-DATA  ******

000165        56     $PLTVAR
000166        56      IJ=3,  LLSYM(3)=3H6,   LLABP(3,1)=6HOS   HA,6HINT   0,
000167        56       LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=150.
000168        56     $END
000169        56     $PRIORI   KKRNK=1, IINK=1
000170        56     $END
000171        56     $INITAL
000172        56      MSTOP=1, JJCLR=1, JJBEG=1, TTBEG=0., JJFIL=1 , TTFIN=61. , IICRD=0
000173        56     $END
000174        56     $SEEDS
000175        56     $END
000176        56     $AGAIN
000177        56      LLSUP(1)=2,2,2,2,2,2,2,2,2,2,2,2,2,2,  IICRD=13
000178        56     $END


******  DATIN-DATA  ******
```

```
****** DOHIST ******

000001   00        SUBROUTINE DOHIST
000002   00   C
000003   00   C THIS SUBROUTINE CALLS THE GASP HISTOGRAM ROUTINE FOR
000004   00   C DS MAINTENANCE ASSOCIATED WITH EACH COMBAT UNIT
000005   00   C
000006   00        INCLUDE COMMON.LIST
000007   00        TOTAL=0.0
000008   01        TOTALA=0.0
000009   01        TOTALB=0.0
000010   00        DO 100 J=1,NTYPES
000011   00        DO 100 I=1,NUNITS
000012   00        DO 100 L=1,2
000013   00        TOTAL=TOTAL+NCC1(I,J,1,L)
000014   00    100 CONTINUE
000015   01        DO 200 J=1,NTYPES
000016   01        DO 150 I=1,NC2
000017   01    150 TOTALA=TOTALA + NCC2(I,1,J)
000018   03        DO 175 I=2,NC2
000019   01    175 TOTALB=TOTALB + NCC2(I,1,J)
000020   01    200 CONTINUE
000021   01        CALL HISTO(TOTAL,1)
000022   01        CALL HISTO(TOTALA,2)
000023   01        CALL HISTO(TOTALB,3)
000024   01   C
000025   01   C HISTOGRAM 2 PLOTS REAR DS MAINTENANCE QUEUE
000026   01   C HISTOGRAM 3 PLOTS REAR OS MAINTENANCE QUEUE
000027   01   C
000028   00        RETURN
000029   00        END

****** DOHIST ******
```

****** EVNTS ******

```
000001       30          SUBROUTINE EVNTS (IX)
000002       30          INCLUDE COMMON.LIST
000003       30          DATA TANK /0.0/
000004       30          NAMELIST /OUTREP/ DSMCM,DSMCN,DSCOM,DSCOM
000005       30          NAMELIST / TIME / TNOW,TTLAS,MSTOP,KDAY
000006       34    CS     WRITE (13,TIME)
000007       30          IF (TTLAS .NE. TNOW-1.)  GOTO 10
000008       34    CS     WRITE (13, 1971)TNOW
000009       30     1971 FORMAT (' ***SUBROUTINE EVNTS CALLED AGAIN AT TNOW= ',
000010       30         1 F10.1,' *****')
000011       34    CS     WRITE (13,OUTREP)
000012       30          GOTO 11
000013       30       10 TTLAS = TNOW - 1.
000014       30          IF (IFIX(TNOW)  .EQ.1 .OR. IFIX(TNOW) .GE.KDAY) GOTO 19
000015       30          CALL SSAVE
000016       32       19 WRITE (6, 1970)TNOW
000017       33     1970 FORMAT (1H ,' *****SUBROUTINE EVNTS INITIALLY CALLED AT TNOW= ',
000018       30         + F10.1,' *****///)
000019       30       11 IF (TNOW.GE.IFIX(KDAY)) GOTO 199
000020       30    C
000021       34    CS     WRITE (13,OUTREP)
000022       30    C
000023       30          GO TO(1,2,3,4,5,6,7,8,9),IX
000024       30    C
000025       30    C THE DAILY EVENTS CYCLE
000026       30    C     SUBROUTINE EVNTS (IX)
000027       30         1 CALL UNSTAT(DLYMOS)
000028       30           CALL UNMAIN
000029       30           CALL MAINT
000030       30           CALL WARES
000031       30           CALL THSTOK(DLYSUP,DLYPER)
000032       32           CALL CHECK(1)
000033       30           ATRIB(2)=1.0
000034       30           ATRIB(1)=TNOW+1
000035       30           CALL FILEM(1)
000036       30           GSS=GSUS
000037       30           IF (TNOW.GE.RELOC) GSS=0.0
000038       30           DO 430 I=1,NUNITS
000039       30           IF (THTRSH(I,1) .GE. 2.0) TANK=TANK+UNITON(I,1,1)
000040       30       430 CONTINUE
000041       30           GOTO 27
000042       30    C
000043       30    C THE ARRIVAL OF A UNIT
000044       30    C
000045       30         2 CALL ARRIVL
000046       30           GOTO 27
000047       30    C
000048       30    C THE COMMITMENT OF A UNIT
000049       30    C
000050       30         3 CALL COMMIT
000051       30           GOTO 27
000052       30    C
000053       30    C THE ARRIVAL OF PERSONNEL FROM HOSPITAL TO THEATER
000054       30    C
000055       30         4 CALL HOSPTL
000056       30           GOTO 27
000057       30    C
000058       30    C THE ARRIVAL OF RESUPPLIES FROM THEATER
000059       30    C
000060       30         5 CALL URESUP
000061       30           GOTO 27
000062       30
000063       30    C THE ARRIVAL SUPPLIES TO WAR RESERVES
000064       30    C
000065       30         6 CALL WRARR
000066       30           GOTO 27
000067       30    C
000068       30    C THE ARRIVAL CONUS REPLACE PERSONNEL TO THE THEATER
000069       30    C
000070       30         7 CALL RESERV
000071       30           GOTO 27
000072       30    C
000073       30    C THE ARRIVAL OF ADDITIONAL MAINTENANCE OR RESUPPLY CAPACITY
000074       30    C
000075       30         8 CALL MASUIN
000076       30           GOTO 27
000077       30         9 CALL UNITOS
000078       30           GO TO 27
000079       30       199  CONTINUE
000080       34    CS     WRITE (13,TIME)
000081       30        27 RETURN
000082       30           END
```

```
****** HOSPTL ******

000001      02          SUBROUTINE HOSPTL
000002      02          INCLUDE COMMON.LIST
000003      06    C$     WRITE (13, 1971)TNOW
000004      02     1971 FORMAT (' ****SUBROUTINE HOSPTL CALLED AT ',F10.1,' *****')
000005      02    C
000006      02    C THIS SUBROUTINE HANDLES ARRIVAL OF HOSPITAL TO THEATER STOCK RETURNEES
000007      02    C
000008      02          N=IFIX(ATRIB(7))
000009      06    C$     WRITE (13,1979) NOSPIN(N)
000010      03          NOSPIN(N)=NOSPIN(N)+ATRIB(3)
000011      06    C$     WRITE (13,1979) NOSPIN(N),ATRIB(5)
000012      02          RETURN
000013      02          END

****** HOSPTL ******
```

```
 ****** INTLC  ******

000001       23          SUBROUTTINE INTLC
000002       23          INCLUDE COMMON
000003       23          DATA ATRIB(1),ATRIB(2),ATRIB(3),ATRIB(4),ATRIB(5),ATRIB(6),ATRIB(
000004       23         1 7)/0.0,1.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/
000005       23          DATA L1,L2,L3,L3A /6HUNITS ,4HDDAY  ,4HKDAY  ,6HNRATE /
000006       23          DATA L4,L5,L6/6HNACAPT,6HNCNRAT,6HCONRAT/
000007       23          DATA L7,L8,L9,L10/6HPERRAT,6HUNREP ,6HDAMRAT,6HABRAT /
000008       23          DATA L11,L12,L13,L14/6HCRWLSR,6HPWRSHR,6HUNECRT,6HPWRS  /
000009       23          DATA L15,L16,L17,/6HREPRAT,6HPWRSRT,6HOLYSTA/
000010       23          DATA L19,L20,L21,L22/6HOLYPON,6HOLYCON,6HOLYNOS,6HOLYSUP/
000011       23          DATA L23,L24,L25,L26/6HOLYPER,6HOLYNAI,6HOSNCN ,6HOSCON /
000012       23          DATA L27,L28,L29,L30/6HBSNCN ,6HBSCON ,6HNAFACT,6HCRWPER/
000013       23          DATA L31,L32,L33,L34/6HREWART,6HNARRS ,6HURESUP,6HUREPL /
000014       23          DATA L35/6HNARRMS/
000015       23          PRINT 1, TNOW
000016       23    C
000017       23    C INPUT THE NUMBER OF UNITS (NUNITS) AND THE NUMBER OF TYPES OF
000018       23    C  EQUIPMENT IN EACH OF THOSE UNITS (NTYPES).  THE PARAMETER VALUES
000019       23    C  U AND T IN THE PROC MUST EXCEED THOSE INPUT HERE, SO THAT THE ARRAYS
000020       23    C  ARE PROPERLY DIMENSIONED.
000021       23    C
000022       23          CALL PRNTO(1)
000023       23          WRITE(NPRNT,1020) L1
000024       23    C ***********************************************************************
000025       23    C *                                                                     *
000026       23    C *                                    NUNITS                           *
000027       23    C *                                                                     *
000028       23    C ***********************************************************************
000029       23          READ (15,1010) NUNITS
000030       23    C ***********************************************************************
000031       23    C *                                                                     *
000032       23    C *                                    NTYPES                           *
000033       23    C *                                                                     *
000034       23    C ***********************************************************************
000035       23          READ (15,1010) NTYPES
000036       23          WRITE (NPRNT,1010) NUNITS, NTYPES
000037       23    C
000038       23          WRITE(NPRNT,1020) L2
000039       23    C ***********************************************************************
000040       23    C *                                                                     *
000041       23    C *                                    DDAY                             *
000042       23    C *                                                                     *
000043       23    C ***********************************************************************
000044       23          READ(15,1000) DDAY
000045       23          WRITE(NPRNT,1979) DDAY
000046       23          WRITE(NPRNT,1020) L3
000047       23    C ***********************************************************************
000048       23    C *                                                                     *
000049       23    C *                                    KDAY                             *
000050       23    C *                                                                     *
000051       23    C ***********************************************************************
000052       23          READ (15,1010) KDAY
000053       23          WRITE(NPRNT,1978) KDAY
000054       23          DO 916 IRA=1,7
000055       23        916 ATRIB(IRA)=0.0
000056       23          ATRIB(2)=1.0
000057       23          ATRIB(1)=ATRIB(1)+1.0
000058       23          CALL FILEM(1)
000059       23          PRINT 91
000060       23           91   FORMAT(' INTLC:  FILEM(1) FOR ATRIB(1) COMPLETED.')
000061       23          TANK=0.0
000062       23          DO 50 J=1,NTYPES
000063       23          DO 1234 MM=1,60
000064       23          DO 1234 II=1,21
000065       23          IF(II.LE.3)DELTA(II,MM,J)=0.0
000066       23          IF(II.LE.11)IN(II,MM,J)=0.0
000067       23         1234 OUT(II,MM,J)=0.0
000068       23          PRNLOS(J)=0.
000069       23          PERLOS(J)=0.
000070       23          TSPNOT(J) = 0.
000071       23          PWRSIN(J) = 0.
000072       23          PERSIN(J) = 0.
000073       23          UNECON(J) = 0.
000074       23          HOSPIN(J) = 0.
000075       23          REPOUT(J) = 0.
000076       23          PWRSOU(J) = 0.
000077       23          PWRSIN(J) = 0.
000078       23          HOSP(J)=0.
000079       23          OTBS(J)=0.
000080       23          OTRDS(J)=0.
000081       23          OTUMOS(J)=0.
000082       23          DFRARR(J)=0.

 ****** INTLC  ******
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000083       23          PTRANS(J)=0.
000084       23          RDSIN(J)=0.
000085       23          SUPTOT(J)=0.
000086       23          TDSIN(J)=0.
000087       23          UNDSIN(J)=0.
000088       23          DO 40 I=1,4
000089       23       40 CONTINUE
000090       23          DO 45 I=1,NUNITS
000091       23    C
000092       23    C COLUMN 1 OF THE THEATER STATUS MATRIX (THTRSM) CAN HAVE A VALUE
000093       23    C  BETWEEN 0 AND 2, INCLUSIVE.  THE MEANINGS ARE:
000094       23    C       0= THE UNIT HAS NOT ARRIVED.
000095       23    C       1= THE UNIT HAS ARRIVED.
000096       23    C       2= THE UNIT IS COMMITTED.
000097       23    C
000098       23    C THE MEANINGS OF COLUMNS 2 AND 3 ARE EXPLAINED LATER IN THIS PROGRAM.
000099       23    C
000100       23          THTRSM(I,1)=0.
000101       23          CREWAV(I,J) = 0.
000102       23          BACKPL(I,J)=0.
000103       23          BACKLG(I,J)=0.
000104       23          RESUPO(I,J,1)=0.
000105       23          RESUPA(I,J,1)= 0.
000106       23          RESUPA(I,J,2)= 0.
000107       23          RESUPO(I,J,2)=0.
000108       23          TSTOCK(I,J)=0.
000109       23          TPERS(I,J)=0.
000110       23          UNITON(I,J,1)=0.
000111       23          UNTMAC(I,J)=0.0
000112       23       45 UNITON(I,J,2)=0.
000113       23       50 CONTINUE
000114       23          PRINT 92
000115       23       92 FORMAT (' INTLC:  ZEROING OUT OF ARRAYS COMPLETED.')
000116       23    C ***************************************************************
000117       23    C *                                                             *
000118       23    C *                                                 NMATE       *
000119       23    C *                                                             *
000120       23    C ***************************************************************
000121       23    C
000122       23    C INPUT THE NUMBER OF ROWS IN THE MAINTENANCE CAPACITY LOOKUP TABLE
000123       23    C
000124       23          WRITE(NPRNT,1020) L3A
000125       23          READ (15,1030) ALPHA
000126       23    C     WRITE (NPRNT,1031) ALPHA
000127       23          READ(15,1010) NMATE
000128       23          WRITE(NPRNT,1979) NMATE
000129       23          WRITE(NPRNT,1020) L4
000130       23          READ (15,1030) ALPHA
000131       23    C     WRITE (NPRNT,1031) ALPHA
000132       23          DO 500 I=1,NMATE
000133       23    C INPUT THE DIRECT SUPPORT COMBAT UNIT ASSOCIATED MAINTENANCE CAPABILITY LOOK-UP
000134       23    C TABLE.  IN EACH ROW, INPUT THE SERIAL NUMBER, THE TOTAL MAINTENANCE CAPACITY,
000135       23    C AND THEN THE FRACTION OF THE COMBAT UNIT'S CAPACITY DEVOTED TO EACH TYPE OF
000136       23    C EQUIPMENT.
000137       23    C UNITS FOR MAINTENANCE IS NUMBER OF MAN HOURS AVAILABLE PER DAY.
000138       23          NCOUNT=NTYPES+2
000139       23          READ(15,1000)(MACAPT(I,J),J=1,NCOUNT)
000140       23          WRITE(NPRNT,1979)(MACAPT(I,J),J=1,NCOUNT)
000141       23      500 CONTINUE
000142       23          WRITE(NPRNT,1020) L5
000143       23    C ***************************************************************
000144       23    C *
000145       23    C *   CHECK ARRAY SIZE AGAINST INPUT DATA REQUIREMENTS.
000146       23    C *   ERROR CONDITIONS ARE:
000147       23    C *   S < NMATE
000148       23    C *   D < KDAY
000149       23    C *   U < NUNITS
000150       23    C *   T < NTYPES
000151       23    C *
000152       23    C ***************************************************************
000153       23          IF (S.LT.NMATE.OR.D.LT.KDAY.OR.U.LT.NUNITS.OR.T.LT.NTYPES)
000154       23         + GOTO 3001
000155       23          GOTO 3002
000156       27     3001 III S = S
000157       23          III D = D
000158       23          III U = U
000159       27          III T = T
000160       26          WRITE (6,3000) IIIS,IIID,IIIU,IIIT,NMATE,KDAY,NUNITS,NTYPES
000161       23     3000 FORMAT (//,' INTLC:  FATAL ERROR -- THE PROGRAM ARRAY SIZE '
000162       23         +,'SPECIFIED IN FORTRAN PROC PARAMETER STATEMENT) IS SMALLER THAN '
000163       23         +,/,' THE REQUIREMENTS OF THE INPUT DECK.',/,' PARAMETERS:  '
000164       23         +'S,D,U,T=',T50,4(I5,3X),/,' INTLC DATA DECK:  NMATE,KDAY,NUNITS,'

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****** INTLC ******

000165       23          *,'NTYPES=',T50,*(I5,3X))
000166       23          CALL UERRE(1)
000167       23          STOP
000168       23    C ***********************************************************************
000169       23    C *                                                                     *
000170       23    C *                                                  NCMRAT             *
000171       23    C *                                                                     *
000172       23    C ***********************************************************************
000173       23    C INPUT NONCOMBAT LOSS RATES FOR EACH EQUIPMENT TYPE.
000174       24     3002 READ (15,1030) ALPHA
000175       23    C      WRITE (NPRNT,1031) ALPHA
000176       23           READ(15,1000) (NCMRAT(I),I=1,NTYPES)
000177       23           WRITE(NPRNT,1979)(NCMRAT(I),I=1,NTYPES)
000178       23           WRITE(NPRNT,1020) L6
000179       23    C ***********************************************************************
000180       23    C *                                                                     *
000181       23    C *                                                  COMRAT             *
000182       23    C *                                                                     *
000183       23    C ***********************************************************************
000184       23    C INPUT COMBAT LOSS RATES FOR EACH EQUIPMENT TYPE
000185       23           READ (15,1030) ALPHA
000186       23    C      WRITE (NPRNT,1031) ALPHA
000187       23           READ(15,1000) (COMRAT(I),I=1,NTYPES)
000188       23           WRITE(NPRNT,1979)(COMRAT(I),I=1,NTYPES)
000189       23           WRITE(NPRNT,1020) L7
000190       23    C ***********************************************************************
000191       23    C *                                                                     *
000192       23    C *                                                  PERRAT             *
000193       23    C *                                                                     *
000194       23    C ***********************************************************************
000195       23    C INPUT CREW LOSS RATES WHICH WILL OCCUR DURING COMBAT.
000196       23           READ (15,1030) ALPHA
000197       23    C      WRITE (NPRNT,1031) ALPHA
000198       23           READ(15,1000) (PERRAT(I),I=1,NTYPES)
000199       23           WRITE(NPRNT,1979)(PERRAT(I),I=1,NTYPES)
000200       23           WRITE(NPRNT,1020) L8
000201       23    C ***********************************************************************
000202       23    C *                                                                     *
000203       23    C *                                                  UNREP              *
000204       23    C *                                                                     *
000205       23    C ***********************************************************************
000206       23    C INPUT UNREPARABLE RATES (FOR NONCOMBAT LOASSES).
000207       23           READ (15,1030) ALPHA
000208       23    C      WRITE (NPRNT,1031) ALPHA
000209       23           READ(15,1000) (UNREP(I),I=1,NTYPES)
000210       23           WRITE(NPRNT,1979)(UNREP(I),I=1,NTYPES)
000211       23           WRITE(NPRNT,1020) L9
000212       23    C ***********************************************************************
000213       23    C *                                                                     *
000214       23    C *                                                  DAMRAT             *
000215       23    C *                                                                     *
000216       23    C ***********************************************************************
000217       23    C INPUT PERMANENT DAMAGE RATES
000218       23           READ (15,1030) ALPHA
000219       23    C      WRITE (NPRNT,1031) ALPHA
000220       23           READ(15,1000) (DAMRAT(I),I=1,NTYPES)
000221       23           WRITE(NPRNT,1979)(DAMRAT(I),I=1,NTYPES)
000222       23           WRITE(NPRNT,1020) L10
000223       23    C ***********************************************************************
000224       23    C *                                                                     *
000225       23    C *                                                  ABRAT              *
000226       23    C *                                                                     *
000227       23    C ***********************************************************************
000228       23    C INPUT ABANDON RATE
000229       23           READ (15,1030) ALPHA
000230       23    C      WRITE (NPRNT,1031) ALPHA
000231       23           READ(15,1000) (ABRAT(I),I=1,NTYPES)
000232       23           WRITE(NPRNT,1979)(ABRAT(I),I=1,NTYPES)
000233       23           WRITE(NPRNT,1020) L11
000234       23    C ***********************************************************************
000235       23    C *                                                                     *
000236       23    C *                                                  CRWLSR             *
000237       23    C *                                                                     *
000238       23    C ***********************************************************************
000239       23    C
000240       23    C INPUT PERMANENT CREW LOSS RATE
000241       23           READ (15,1030) ALPHA
000242       23    C      WRITE (NPRNT,1031) ALPHA
000243       23           READ (15,1000) (CRWLSR(I),I=1,NTYPES)
000244       23           WRITE(NPRNT,1979) (CRWLSR(I),I=1,NTYPES)
000245       23           WRITE(NPRNT,1020) L12

****** INTLC ******
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****** INTLC ******

000246      23   C ***********************************************************************
000247      23   C *                                                                     *
000248      23   C *                                PWRSHR                               *
000249      23   C *                                                                     *
000250      23   C ***********************************************************************
000251      23   C INPUT THE MAN HOURS OF PREPARATION EACH PIECE OF EQUIPMENT REQUIRES.
000252      23        READ (15,1030) ALPHA
000253      23   C    WRITE (NPRNT,1031) ALPHA
000254      23        READ(15,1000)(PWRSHR(J),J=1,NTYPES)
000255      23        WRITE(NPRNT,1979)(PWRSHR(J),J=1,NTYPES)
000256      23        WRITE(NPRNT,1020) L13
000257      23   C ***********************************************************************
000258      23   C *                                                                     *
000259      23   C *                                UNECRT                               *
000260      23   C *                                                                     *
000261      23   C ***********************************************************************
000262      23   C INPUT THE UNECONOMICALLY REPAIRABLE RATES.
000263      23        READ (15,1030) ALPHA
000264      23   C    WRITE (NPRNT,1031) ALPHA
000265      23        READ(15,1000)(UNECRT(J),J=1,NTYPES)
000266      23        WRITE(NPRNT,1979)(UNECRT(J),J=1,NTYPES)
000267      23        WRITE(NPRNT,1020) L14
000268      23   C ***********************************************************************
000269      23   C *                                                                     *
000270      23   C *                                PWRS                                 *
000271      23   C *                                                                     *
000272      23   C ***********************************************************************
000273      23   C INPUT INITIAL WAR RESERVES STOCK
000274      23        READ (15,1030) ALPHA
000275      23   C    WRITE (NPRNT,1031) ALPHA
000276      23        READ(15,1000)(PWRS(J),J=1,NTYPES)
000277      23        DO 600 J=1,NTYPES
000278      23      600 WARRES(J)=PWRS(J)
000279      23        WRITE(NPRNT,1979)(PWRS(J),J=1,NTYPES)
000280      23        WRITE(NPRNT,1020) L15
000281      23   C ***********************************************************************
000282      23   C *                                                                     *
000283      23   C *                                REPRAT                               *
000284      23   C *                                                                     *
000285      23   C ***********************************************************************
000286      23   C INITIAL INITIAL REPAIR RATES IN MANHOURS
000287      23   C      1 IS FOR DS
000288      23   C      2 IS FOR BS
000289      23        READ (15,1030) ALPHA
000290      23   C    WRITE (NPRNT,1031) ALPHA
000291      23        READ(15,1000)(REPRAT(1,J),J=1,NTYPES)
000292      23        READ(15,1000)(REPRAT(2,J),J=1,NTYPES)
000293      23        WRITE(NPRNT,1979)(REPRAT(1,J),J=1,NTYPES)
000294      23        WRITE(NPRNT,1979)(REPRAT(2,J),J=1,NTYPES)
000295      23        BS = REPRAT(2,1)
000296      23        WRITE(NPRNT,1020) L16
000297      23   C ***********************************************************************
000298      23   C *                                                                     *
000299      23   C *                                PWRSRT                               *
000300      23   C *                                                                     *
000301      23   C ***********************************************************************
000302      23   C INITIALIZE WAR RESERVE OUTPUT RATES IN MANHOURS PER DAY.
000303      23        READ (15,1030) ALPHA
000304      23   C    WRITE (NPRNT,1031) ALPHA
000305      23        READ(15,1000)(PWRSRT(J),J=1,NTYPES)
000306      23        WRITE(NPRNT,1979)(PWRSRT(I),I=1,NTYPES)
000307      23        WRITE(NPRNT,1020) L17
000308      23   C ***********************************************************************
000309      23   C *                                                                     *
000310      23   C *                                DLYSTA                               *
000311      23   C *                                                                     *
000312      23   C ***********************************************************************
000313      23   C INPUT ON STATION COMMITMENT DELAY
000314      23        READ (15,1030) ALPHA
000315      23   C    WRITE (NPRNT,1031) ALPHA
000316      23        READ(15,1000) DLYSTA
000317      23        WRITE(NPRNT,1979) DLYSTA
000318      23        WRITE(NPRNT,1020) L19
000319      23   C INPUT POMCUS COMMITMENT DELAY
000320      23   C ***********************************************************************
000321      23   C *                                                                     *
000322      23   C *                                DLYPOM                               *
000323      23   C *                                                                     *
000324      23   C ***********************************************************************
000325      23        READ (15,1030) ALPHA
000326      23   C    WRITE (NPRNT,1031) ALPHA
000327      23        READ(15,1000) DLYPOM
000328      23        WRITE(NPRNT,1979) DLYPOM
000329      23        WRITE(NPRNT,1020) L20

****** INTLC ******
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****** INTLC ******

000330      23    C ***********************************************************************
000331      23    C *                                                                     *
000332      23    C *                                                DLYCON               *
000333      23    C *                                                                     *
000334      23    C ***********************************************************************
000335      23    C INPUT CONUS COMMITMENT DELAY
000336      23          READ (15,1030) ALPHA
000337      23    C     WRITE (NPRNT,1031) ALPHA
000338      23          READ(15,1000) DLYCON
000339      23          WRITE(NPRNT,1979) DLYCON
000340      23          WRITE(NPRNT,1020) L21
000341      23    C INPUT HOSPITAL RETURN TO THEATER PERSONNEL DELAY
000342      23    C ***********************************************************************
000343      23    C *                                                                     *
000344      23    C *                                                DLYHOS               *
000345      23    C *                                                                     *
000346      23    C ***********************************************************************
000347      23          READ (15,1030) ALPHA
000348      23    C     WRITE (NPRNT,1031) ALPHA
000349      23          READ(15,1000) DLYHOS
000350      23          WRITE(NPRNT,1979) DLYHOS
000351      23          WRITE(NPRNT,1020) L22
000352      23    C INPUT DELAY FOR SUPPLIES SHIPPED FROM THEATER STOCKS TO UNITS.
000353      23    C ***********************************************************************
000354      23    C *                                                                     *
000355      23    C *                                                DLYSUP               *
000356      23    C *                                                                     *
000357      23    C ***********************************************************************
000358      23          READ (15,1030) ALPHA
000359      23    C     WRITE (NPRNT,1031) ALPHA
000360      23          READ(15,1000) DLYSUP
000361      23          WRITE(NPRNT,1979) DLYSUP
000362      23          WRITE(NPRNT,1020) L23
000363      23    C INPUT PERSONNEL TO UNIT SHIPMENT DELAY
000364      23    C ***********************************************************************
000365      23    C *                                                                     *
000366      23    C *                                                DLYPER               *
000367      23    C *                                                                     *
000368      23    C ***********************************************************************
000369      23          READ (15,1030) ALPHA
000370      23    C     WRITE (NPRNT,1031) ALPHA
000371      23          READ(15,1000) DLYPER
000372      23          WRITE(NPRNT,1979) DLYPER
000373      23          WRITE(NPRNT,1020) L24
000374      23    C INPUT DELAY IN DS MAINTAINENCE
000375      23    C ***********************************************************************
000376      23    C *                                                                     *
000377      23    C *                                                DLYMAI               *
000378      23    C *                                                                     *
000379      23    C ***********************************************************************
000380      23          READ (15,1030) ALPHA
000381      23    C     WRITE (NPRNT,1031) ALPHA
000382      23          READ(15,1000) DLYMAI
000383      23          WRITE(NPRNT,1979) DLYMAI
000384      23    C ***********************************************************************
000385      23    C *                                                                     *
000386      23    C *                                                DSNCM                *
000387      23    C WHERE DO THE DAMAGED UNITS GO?  INPUT THE FRACTION OF NONCOMBAT LOSSES THAT
000388      23    C *                                                                     *
000389      23    C ***********************************************************************
000390      23    C GOES TO DS MAINTENANCE.
000391      23          READ (15,1030) ALPHA
000392      23    C     WRITE (NPRNT,1031) ALPHA
000393      23          READ(15,1000) (DSNCM(I),I=1,NTYPES)
000394      23          WRITE(NPRNT,1020) L25
000395      23          WRITE(NPRNT,1979) (DSNCM(I),I=1,NTYPES)
000396      23    C ***********************************************************************
000397      23    C *                                                                     *
000398      23    C *                                                DSCON                *
000399      23    C *                                                                     *
000400      23    C ***********************************************************************
000401      23    C WHERE DO THE DAMAGED UNITS GO?  INPUT THE FRACTION OF COMBAT LOSSES THAT
000402      23    C GOES TO DS MAINTENANCE.
000403      23          READ (15,1030) ALPHA
000404      23    C     WRITE (NPRNT,1031) ALPHA
000405      23          READ(15,1000) (DSCOM(I),I=1,NTYPES)
000406      23          WRITE(NPRNT,1020) L26
000407      23          WRITE(NPRNT,1979) (DSCOM(I),I=1,NTYPES)
000408      23          DO 2 I=1,NTYPES
000409      23          GSNCM(I)=1.-DSNCM(I)
000410      23          GSCOM(I)=1.-DSCOM(I)
000411      23        2 CONTINUE

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****** INTLC ******

000412      23          WRITE(NPRNT,1020) L27
000413      23          WRITE(NPRNT,1979) (BSMCM(I),I=1,NTYPES)
000414      23          WRITE(NPRNT,1020) L28
000415      23          WRITE(NPRNT,1979) (BSCOM(I),I=1,NTYPES)
000416      23          WRITE(NPRNT,1020) L29
000417      23    C ***********************************************************
000418      23    C *                                                         *
000419      23    C *                                                 MAFACT  *
000420      23    C *                                                         *
000421      23    C ***********************************************************
000422      23    C MAFACT(1,J) = AVERAGE OS MAINTENTANCE TIME FOR NONCOMBAT EQUIPMENT BY TYPE.
000423      23    C MAFACT(2,J) = AVERAGE OS MAINTENTANCE TIME FOR NONCOMBAT EQUIPMENT BY TYPE.
000424      23    C MAFACT(3,J) = AVERAGE OS MAINTENTANCE TIME FOR COMBAT EQUIPMENT BY TYPE.
000425      23    C MAFACT(4,J) = AVERAGE OS MAINTENTANCE TIME FOR COMBAT EQUIPMENT BY TYPE.
000426      23          DO 3 I=1,4
000427      23          READ (15,1030) ALPHA
000428      23    C     WRITE (NPRNT,1031) ALPHA
000429      23          READ(15,1000) (MAFACT(I,J),J=1,NTYPES)
000430      23          WRITE(NPRNT,1979) (MAFACT(I,J),J=1,NTYPES)
000431      23        3 CONTINUE
000432      23          WRITE(NPRNT,1020) L30
000433      23    C ***********************************************************
000434      23    C *                                                         *
000435      23    C *                                                 CRWPER  *
000436      23    C *                                                         *
000437      23    C ***********************************************************
000438      23    C INPUT CREW SIZES BY TYPE EQUIPMENT.
000439      23          READ (15,1030) ALPHA
000440      23    C     WRITE (NPRNT,1031) ALPHA
000441      23          READ(15,1000) (CRWPER(I),I=1,NTYPES)
000442      23          WRITE(NPRNT,1979) (CRWPER(I),I=1,NTYPES)
000443      23    C ***********************************************************
000444      23    C *                                                         *
000445      23    C *                                                 THTRSM  *
000446      23    C *                                                         *
000447      23    C ***********************************************************
000448      23    C
000449      23    C HERE'S THE EXPLAINATION FOR COLUMNS TWO AND THREE IN THE
000450      23    C  THEATER STATUS MATRIX (THTRSM).  COLUMN TWO RECORDS WHERE THE UNIT
000451      23    C  CAME FROM.  THE MEANINGS ARE:
000452      23    C    1.0= COMBAT UNIT ON STATION
000453      23    C    2.0= PONCUS UNIT
000454      23    C    3.0= CONUS UNIT
000455      23    C
000456      23    C THE THIRD COLUMN CONTAINS THE SERIAL NUMBERS ASSOCIATED WITH EACH
000457      23    C  UNIT.  THEY ARE USED IN THE MODEL IN THE MAINTAINENCE LOOKUP TABLE.
000458      23    C AND THE LAST ENTRY IN THE ROW IS THE ARRIVAL TIME.
000459      23    C
000460      23          READ (15,1030) ALPHA
000461      23    C     WRITE (NPRNT,1031) ALPHA
000462      23          READ (15,1030) ALPHA
000463      23    C     WRITE (NPRNT,1031) ALPHA
000464      23          READ (15,1030) ALPHA
000465      23    C     WRITE (NPRNT,1031) ALPHA
000466      23          WRITE(NPRNT,1020) L31
000467      23          DO 200 I=1,NUNITS
000468      23          ATRIB(2)=2.0
000469      23          ATRIB(3)=I
000470      23          READ(15,1000) THTRSM(I,2),THTRSM(I,3),ATRIB(1)
000471      23          WRITE(NPRNT,1979) THTRSM(I,2),THTRSM(I,3),ATRIB(1)
000472      23          IF (THTRSM(I,2) .NE. 1.0) CALL FILEN(1)
000473      23    C ***********************************************************
000474      23    C *                                                         *
000475      23    C *                                                 UNITAU  *
000476      23    C *                                                         *
000477      23    C ***********************************************************
000478      23    C
000479      23    C INPUT THE UNIT'S AUTHORIZED EQUIPMENT
000480      23    C
000481      23          READ(15,1000) (UNITAU(I,J,1),J=1,NTYPES)
000482      23          WRITE(NPRNT,1979) (UNITAU(I,J,1),J=1,NTYPES)
000483      23    C
000484      23    C INPUT THE UNIT'S AUTHORIZED PERSONNEL
000485      23    C
000486      23          READ(15,1000) (UNITAU(I,J,2),J=1,NTYPES)
000487      23          WRITE(NPRNT,1979) (UNITAU(I,J,2),J=1,NTYPES)
000488      23    C
000489      23    C IF YOU HAVE AN ONSTATION UNIT, SCHEDULE ARRIVAL OF UNIT AT FEBA
000490      23    C
000491      23          IF(THTRSM(I,2).EQ.1.0) CALL ONHAND(I,OLYSTA)
000492      23      200 CONTINUE

****** INTLC ******
```

```
******  INTLC  ******

000493      23    C ***********************************************************************
000494      23    C *                                                                     *
000495      23    C *                                NRESUP                               *
000496      23    C *                                                                     *
000497      23    C ***********************************************************************
000498      23    C
000499      23    C INPUT THE NUMBER OF WAR RESERVES RESUPPLY EVENTS.
000500      23    C
000501      23          WRITE (NPRNT,1020) L33
000502      23          READ (15,1030) ALPHA
000503      23    C     WRITE (NPRNT,1031) ALPHA
000504      23          READ (15,1010) NRESUP
000505      23          WRITE (NPRNT,1979) NRESUP
000506      23          READ (15,1030) ALPHA
000507      23    C     WRITE (NPRNT,1031) ALPHA
000508      23          IF (NRESUP) 260,270,261
000509      23      261 ATRIB(2)=6.0
000510      23          ATRIB(3)=0.0
000511      23          DO 269 I=1,NRESUP
000512      23    C
000513      23    C INPUT THE TIME, EQUIPMENT QUANTITY AND TYPE THAT RECEIVES RESUPPLIES IN
000514      23    C WAR RESERVES.
000515      23    C
000516      23          READ(15,1000)ATRIB(1),ATRIB(4),ATRIB(7)
000517      23          WRITE(NPRNT,1979) ATRIB(1),ATRIB(4),ATRIB(7)
000518      23      269 CALL FILEM(1)
000519      23      270 CONTINUE
000520      23    C ***********************************************************************
000521      23    C *                                                                     *
000522      23    C *                                NREPL                                *
000523      23    C *                                                                     *
000524      23    C ***********************************************************************
000525      23    C
000526      23    C INPUT THE NUMBER OF RESERVE REPLACEMENT PERSONNEL EVENTS RECEIVED BY
000527      23    C THE THEATER.
000528      23    C
000529      23          WRITE(NPRNT,1020) L34
000530      23          READ (15,1030) ALPHA
000531      23    C     WRITE (NPRNT,1031) ALPHA
000532      23          READ(15,1010) NREPL
000533      23          WRITE(NPRNT,1979) NREPL
000534      23          IF(NREPL) 280,280,271
000535      23      271 ATRIB(2)=7.0
000536      23          ATRIB(3)=0.0
000537      23          READ (15,1030) ALPHA
000538      23    C     WRITE (NPRNT,1031) ALPHA
000539      23          DO 279 I=1,NREPL
000540      23    C
000541      23    C INPUT TIME, QUANTITY AND TYPE OF PERSON RESUPPLY TO THEATER STOCK
000542      23    C
000543      23          READ(15,1000) ATRIB(1),ATRIB(5),ATRIB(7)
000544      23          WRITE(NPRNT,1979) ATRIB(1),ATRIB(5),ATRIB(7)
000545      23      279 CALL FILEM(1)
000546      23      280 CONTINUE
000547      23    C ***********************************************************************
000548      23    C *                                                                     *
000549      23    C *                                NARRMS                               *
000550      23    C *                                                                     *
000551      23    C ***********************************************************************
000552      23    C
000553      23    C INPUT TIME, QUANTITY, AND EQUIPMENT TYPE WHERE PERSONNEL IS RESUPPLIED
000554      23    C FROM THEATER STOCKS.
000555      23    C
000556      23          READ (15,1030) ALPHA
000557      23    C     WRITE (NPRNT,1031) ALPHA
000558      23          WRITE(NPRNT,1020) L35
000559      23          READ(15,1010)NARRMS
000560      23          WRITE(NPRNT,1979) NARRMS
000561      23          READ (15,1030) ALPHA
000562      23    C     WRITE (NPRNT,1031) ALPHA
000563      23          IF (NARRMS)290,291,281

******  INTLC  ******
```

```
******  INTLC  ******

000564       23     281  ATRIB(2)=8.0
000565       23          ATRIB(4)=0.0
000566       23          DO 290 I=1,NARRNS
000567       23     C
000568       23     C THE INPUT PARAMETERS ARE:
000569       23     C 1)TYPE OF ARRIVAL: 4.0 IS OS MAINTENANCE UNIT
000570       23     C                    5.0 IS OS MAINTENANCE UNIT
000571       23     C                    6.0 IS SUPPLY UNIT
000572       23     C 2)         THE TIME OF ARRIVAL;
000573       23     C 3)         UNIT NUMBER (USE 0.0 IF NOT APPLICABLE);
000574       23     C 4)         INCREASE IN THAT UNIT'S MAINTAINENCE OR SUPPLY CAPACITY;
000575       23     C 5)         TYPE OF EQUIPMENT BEING SUPPLIED.
000576       23     C
000577       23          READ(15,1000) ATRIB(6),ATRIB(1),ATRIB(3),ATRIB(5),ATRIB(7)
000578       23          WRITE(NPRNT,1979) ATRIB(6),ATRIB(1),ATRIB(3),ATRIB(5),ATRIB(7)
000579       23     290  CALL FILEM(1)
000580       23     291  CONTINUE
000581       23          REWIND 15
000582       23     1000 FORMAT (10X,4(F8.0,2X))
000583       23     1010 FORMAT (10X,6(I8,2X))
000584       23     1020 FORMAT(1X,A6)
000585       23        1 FORMAT (1H1,' **********SUBROUTINE INTLC CALLED AT TIME = ',
000586       23         2 F5.0,' ********')
000587       23     1030 FORMAT (A6)
000588       23    C1031 FORMAT (///// ' <<<<<<<<<<<<<<ALPHA>>>>>>>>>>>>>>   :',A6)
000589       23          END

******  INTLC  ******


******  MAIN  ******

000001       29          DIMENSION NSET (10000)
000002       29          INCLUDE COMMON
000003       33     C THE UNIT NUMBERS ARE 13 FOR 82DIAGNOSTIC, 14 82SHORT-DIAG,
000004       33     C  17 FOR 82OPTIMIZAT., AND 15 FOR THE INTLC INPUT DATA;
000005       29          NCRDR=5
000006       29          NPRNT=6
000007       29          PRINT 16
000008       33       16 FORMAT (' ***** ***** ***** START OF RUN ***** ***** *****'
000009       33         +,/' ABSOLUTE PROGRAM:  MULTIRUNS **********************')
000010       29          CALL ERTRAN (6,9HBASG.T 2.)
000011       29          CALL ERTRAN (6,9HBASG.T 3.)
000012       29          CALL ERTRAN (6,9HBASG.T 4.)
000013       29          CALL ERTRAN (6,9HBASG.T 7.)
000014       29          CALL ERTRAN (6,9HBASG.T 8.)
000015       30          CALL ERTRAN (6,9HBASG.T 9.)
000016       29          CALL GASP
000017       29          PRINT 17
000018       29       17 FORMAT (' ***** ***** ***** END OF RUN ***** ***** *****',/1H1)
000019       29          CALL CLOSE(17,2)
000020       29          STOP
000021       29          END


******  MAIN  ******
```

```
******  MAINT  ******
000001       06          SUBROUTINE MAINT
000002       06    C
000003       06    C MCC2(I,J,K)- MAINTENANCE CONTROL CENTER2
000004       06    C                I=1- DS  NONCOMBAT
000005       06    C                I=2- GS  NONCOMBAT
000006       06    C                I=3  DS  COMBAT
000007       06    C                I=4  GS  COMBAT
000008       06    C                J=1  QUEUE  LENGTH
000009       06    C                J=2  QUEUE  INPUT FOR CYCLE
000010       06    C                J=3  QUEUE  OUTPUT FOR CYCLE
000011       06    C                K= COMBAT EQUIPMENT TYPE
000012       06    C
000013       06          INCLUDE COMMON.LIST
000014       06    C
000015       06    C INITIAL CURRENT CYCLE INPUT TOTALS
000016       06    C
000017       10          DO 2005 J=1,NTYPES
000018       06          REPOUT(J)=0.0
000019       06          DO 190 JJ=1,4
000020       06      190 MCC2(JJ,2,J)=0.0
000021       06          DO 200 I=1,NUNITS
000022       06    C
000023       06    C APPORTION LOSSES TO REAR DS AND GS MAINTENANCE
000024       06    C
000025       06          MCC2(1,2,J)=MCC2(1,2,J)+DSN(I,J)
000026       08          RESUP(I,J,1)=RESUP(I,J,1)+DSN(I,J)
000027       06          MCC2(2,2,J)=MCC2(2,2,J)+GSN(I,J)
000028       08          RESUP(I,J,1)=RESUP(I,J,1)+GSN(I,J)
000029       06          MCC2(3,2,J)=MCC2(3,2,J)+DSC(I,J)
000030       08          RESUP(I,J,1)=RESUP(I,J,1)+DSC(I,J)
000031       06          MCC2(4,2,J)=MCC2(4,2,J)+GSC(I,J)
000032       08          RESUP(I,J,1)=RESUP(I,J,1)+GSC(I,J)
000033       07      200 CONTINUE
000034       06          TGSIN(J)=TGSIN(J)+MCC2(2,2,J)+MCC2(4,2,J)
000035       06          RDSIN(J)=RDSIN(J)+MCC2(1,2,J)+MCC2(3,2,J)
000036       10     2005 CONTINUE
000037       09    C$     WRITE(13,1000)
000038       06     1000 FORMAT(1X,'INPUT TO REAR REPAIR QUEUES')
000039       06          DO 201 J=1,NTYPES
000040       09    C$     WRITE(13,1010)   J,(MCC2(I,2,J),I=1,4)
000041       06     1010 FORMAT(1X,'TYPE=',I4,' QUEUE INPUT',4(2X,F10.2,1X))
000042       06      201 CONTINUE
000043       06    C
000044       06    C COMPUTE THE OUTPUT OF MAINTENCE FOR THE CURRENT DAY
000045       06    C
000046       06          DO 220 J=1,NTYPES
000047       06    C  INITIALIZE DIRECT SUPPORT MAINT OUTPUT
000048       06          REPCAP=REPRAT(1,J)
000049       05    C$     WRITE(13,1020) J,REPCAP
000050       06     1020 FORMAT(1X,' TYPE=',I4,'  DS-REPCAP=',F10.2)
000051       06    C
000052       06    C COMPUTE DS MAINTENANCE OUTPUT
000053       06    C
000054       06          DO 210 I=1,4,2
000055       06    C
000056       06    C COMPUTE OUTPUT ONLY IF THERE IS REMAINING DS CAPACITY
000057       06    C
000058       06          IF(REPCAP.EQ.0.0) GO TO 210
000059       06     1030 FORMAT(1X,' TYPE=',I4,' MAINT=',I3,' QUEUE=',F10.2)
000060       06    C
000061       06    C  GO TO 205 IF EQUIPMENT AWAITING REPAIR IS GREAT THAN THE REMAINING DS
000062       06    C  REPAIR CAPACITY
000063       06    C
000064       06          IF(REPCAP.LT.(MAFACT(I,J)*MCC2(I+1,J)))GO TO 205
000065       06    C
000066       06    C COMPUTE DS MAINTENANCE OUTPUT FOR THE CASE OF HAVING FEWER PIECES
000067       06    C OF EQUIPMENT AWAITING REPAIR THAN THE REPAIR CAPACITY
000068       06    C
000069       06          MCC2(I+3,J)=MCC2(I+1,J)
000070       06          MCC2(I+1,J)=0.0
000071       06          REPOUT(J)=REPOUT(J)+MCC2(I+3,J)
000072       06          REPCAP=REPCAP-MAFACT(I,J)*MCC2(I+1,J)
000073       09    C$     WRITE(13,1040) J,I,REPCAP,MCC2(I,1,J)
000074       06     1040 FORMAT(1X,'TYPE=',I4,' MAINT, TYPE=',I3,' DS-REPCAP=',F10.2,
000075       06         1 ' QUEUE LENGTH=',F10.2)
000076       06          OTRDS(J)=OTRDS(J)+MCC2(I+3,J)
000077       06          GO TO 210
000078       06    C
000079       06    C  COMPUTE DS MAINTENANCE OUTPUT WHEN DS REPAIR CAPACITY IS SMALLER
000080       06    C  THAN EQUIPMENT AWAITING REPAIR
000081       06    C
000082       06      205 MCC2(I+3,J)=REPCAP/MAFACT(I,J)
000083       06          REPOUT(J)=REPOUT(J)+MCC2(I+3,J)
000084       06          MCC2(I+1,J)= MCC2(I+1,J)-MCC2(I+3,J)
000085       06          REPCAP=0.0
******  MAINT  ******
```

```
******  MAINT  ******

000086       09   C$      WRITE(13,1040)J,I,REPCAP,MCC2(I,1,J)
000087       06          OTRDS(J)=OTRDS(J)+MCC2(I,3,J)
000088       06     210 CONTINUE
000089       06   C
000090       06   C INITIALIZE  GS REPAIR CAPACITY
000091       06   C
000092       06          REPCAP=REPRAT(2,J)-GSS+GS
000093       09   C$      WRITE(13,1050)J,REPCAP
000094       06    1050 FORMAT(1X,'TYPE=',I3,' GS-REPCAP=',F10.2)
000095       06          DO 220  I=2,4,2
000096       06   C
000097       06   C IF REPAIR CAPACITY IS 0.0 THEN DONOT OUTPUT EQUIPMENT FROM MAINTENANCE
000098       06   C
000099       06          IF(REPCAP .LE. 0.0)GO TO 220
000100       06   C
000101       06   C IF GS MAINTENANCE CAPACITY LESS THEN EQUIPMENT AWAITING REPAIR GOTO215
000102       06   C
000103       09   C$      WRITE(13,1060)J,I,MCC2(I,1,2)
000104       06    1060 FORMAT(1X,'TYPE=',I3,' MAINT TYPE=',I3,' QUEUE=',F10.2)
000105       06          IF(REPCAP.LT.MCC2(I,1,J)*MAFACT(I,J))  GO TO 215
000106       06   C
000107       06   C GS OUTPUT WHEN GS REPAIR CAPACITY IS GREATER THAN QUEUE LENGTH
000108       06   C
000109       06          MCC2(I,3,J)=MCC2(I,1,J)
000110       06          MCC2(I,1,J)=0.0
000111       06          REPCAP=REPCAP-MCC2(I,3,J)*MAFACT(I,J)
000112       06          REPOUT(J)=REPOUT(J)+MCC2(I,3,J)
000113       09   C$      WRITE(13,1070)J,I,REPCAP,MCC2(I,1,J)
000114       06    1070 FORMAT(1X,'TYPE=',I3,' MAINT TYPE=',I3,' GS-REPCAP=',F10.2,
000115       06         1 ' QUEUE-LENGTH=',F10.2)
000116       06          OTGS(J)=OTGS(J)+MCC2(I,3,J)
000117       06          GO TO 220
000118       06   C
000119       06   C GS MAINTENANCE OUTPUT IF REPAIR CAPACITY IS LESS THAN QUEUE LENGTH
000120       06   C
000121       06     215 MCC2(I,3,J)=REPCAP/MAFACT(I,J)
000122       06          REPCAP=0.0
000123       06          MCC2(I,1,J)=MCC2(I,1,J)-MCC2(I,3,J)
000124       06          REPOUT(J)=REPOUT(J)+MCC2(I,3,J)
000125       09   C$      WRITE(13,1070)J,I,REPCAP,MCC2(I,1,J)
000126       06          OTGS(J)=OTGS(J)+MCC2(I,3,J)
000127       06     220 CONTINUE
000128       09   C$      WRITE(13,1080)
000129       06    1080 FORMAT(1X,'QUEUES AFTER MAINTENANCE')
000130       06          CALL OTMCC2
000131       06   C
000132       06   C INPUT NEW ITEMS INTO REPAIR QUEUES
000133       06   C
000134       06          DO 230 J=1,NTYPES
000135       06          DO 230 I=1,4
000136       06     230 MCC2(I,1,J)=MCC2(I,1,J)+MCC2(I,2,J)
000137       09   C$      WRITE(13,1090)
000138       06    1090 FORMAT(1X,'QUEUES AFTER NEW INPUTS')
000139       06          RETURN
000140       06          END

******  MAINT  ******
```

```
******  MASUIN  ******

000001       07          SUBROUTINE MASUIN
000002       07          INCLUDE COMMON.LIST
000003       11    CS     WRITE (13, 1971)TNOW
000004       07     1971 FORMAT (' *****SUBROUTINE MASUIN CALLED AT ',F10.1,' *****')
000005       07    C
000006       07    C THIS SUBROUTINE INCREASES THE SYSTEM'S MAINTENANCE OR SUPPLY CAPACITY
000007       07    C
000008       07          M=IFIX(ATRIB(7))
000009       07          N=IFIX(ATRIB(6)+3.0)
000010       11    CS     WRITE (13,1979) REPRAT(1,M), REPRAT(2,M), PWRSRT(M), DAMRAT(M),
000011       10    CS     1 ABRAT(M),M,N
000012       07          GO TO(100,200,300),N
000013       07      100 REPRAT(1,M)=REPRAT(1,M)+ATRIB(5)
000014       11    CS     WRITE (13,1979) REPRAT(1,M), ATRIB(5)
000015       07          RETURN
000016       07      200 REPRAT(2,M)=REPRAT(2,M)+ATRIB(5)
000017       11    CS     WRITE (13,1979) REPRAT(2,M)
000018       11    CS     WRITE (13,1979) REPRAT(2,M),ATRIB(5)
000019       07          RETURN
000020       07      300 PWRSRT(M)=PWRSRT(M)+ATRIB(5)
000021       11    CS     WRITE (13,1979) PWRSRT(M),ATRIB(5)
000022       07          RETURN
000023       07          END
******  MASUIN  ******


******  OBJCT  ******
000001       00          SUBROUTINE OBJCT(MEAN,PVAR,NNSAM)
000002       00          INCLUDE COMMON.LIST
000003       01          PAVG=TANK
000004       00          PVAR=1
000005       00          NNSAM=-1
000006       00          RETURN
000007       00          END
******  OBJCT  ******


******  ONHAND  ******
000001       03          SUBROUTINE ONHAND(NUNIT,DELAY)
000002       03          INCLUDE COMMON.LIST
000003       03    C
000004       03    C SUBROUTINE ONHAND WILL CREATE THE ON HAND STRENGTH FOR ON STATION UNITS.
000005       03    C IN ADDITION, THIS ROUTINE SCHEDULES THE COMMITMENT TO THE FEBA FOR ALL ON
000006       03    C STATION UNITS
000007       03    C
000008       03          DO 10 I=1,NTYPES
000009       03          UNITON(NUNIT,I,1)=UNITAU(NUNIT,I,1)
000010       03       10 UNITON(NUNIT,I,2)=UNITAU(NUNIT,I,2)
000011       04          THTRSN(NUNIT,1) = 1.0
000012       03          ATRIB(2)=3.0
000013       03          ATRIB(1)=TNOW+DELAY
000014       03          ATRIB(3)=FLOAT(NUNIT)
000015       03          CALL FILEM(1)
000016       03    C INCREASE OS MAINTENANCE FOR UNIT
000017       03    C
000018       03          DO 400 I=1,NMATE
000019       03      400 IF(THTRSN(NUNIT,3).EQ.MACAPT(I,1))GO TO 420
000020       03          WRITE(6,410) NUNIT
000021       03      410 FORMAT(1X,'COMBAT UNIT',I5,' HAS NO ASSOCIATED OS MAINTENANCE')
000022       03          RETURN
000023       03      420 JJ=NTYPES+2
000024       03          DO 430 J=3,JJ
000025       06      430 UNTMAC(NUNIT,J-2)=MACAPT(I,2)+MACAPT(I,J)
000026       03          RETURN
000027       03          END

******  ONHAND  ******
```

```
******  OTHCC1  ******
000001       00          SUBROUTINE OTHCC1
000002       00    C
000003       00    C THIS SUBROUTINE OUTPUTS THE ARRAY HCC1 INTO THE DIAGNOSTIC FILE
000004       00    C
000005       01          INCLUDE COMMON.LIST
000006       00          DO 100 I=1,NUNITS
000007       04    C$     WRITE(13,1000)
000008       00     1000 FORMAT(1X,'HCC1 FOR UNIT NUMBER ',I3)
000009       04    C$     WRITE(13,1010)(HCC1(I,J,1),J=1,NTYPES)
000010       00     1010 FORMAT(1X,'NONCOMBAT LOSS QUEUE'/12(1X,F9.2))
000011       04    C$     WRITE(13,1020)(HCC1(I,J,2),J=1,NTYPES)
000012       00     1020 FORMAT(1X,'COMBAT LOSS QUEUE'/12(1X,F9.2))
000013       04    C$     WRITE(13,1030)(HCC1(I,J,2,1),J=1,NTYPES)
000014       00     1030 FORMAT(1X,'NONCOMBAT QUEUE OUTPUT'/12(1X,F9.2))
000015       04    C$     WRITE(13,1040)(HCC1(I,J,2,2),J=1,NTYPES)
000016       00     1040 FORMAT(1X,'COMBAT QUEUE OUTPUT'/12(1X,F9.2))
000017       04    C$     WRITE(13,1050)(HCC1(I,J,3,1),J=1,NTYPES)
000018       00     1050 FORMAT(1X,'NONCOMBAT QUEUE INPUT'/12(1X,F9.2))
000019       04    C$     WRITE(13,1060)(HCC1(I,J,3,2),J=1,NTYPES)
000020       00     1060 FORMAT(1X,'COMBAT QUEUE INPUT'/12(1X,F9.2))
000021       04    C$     WRITE(13,1070)(UNITOM(I,J,1),J=1,NTYPES)
000022       00     1070 FORMAT(1X,'UNIT STRENGTH'/12(1X,F9.2))
000023       01      100 CONTINUE
000024       00          RETURN
000025       00          END

******  OTHCC1  ******
```

```
******  OTHCC2  ******
000001       02          SUBROUTINE OTHCC2
000002       01          INCLUDE COMMON.LIST
000003       01          DO 200 J=1,NTYPES
000004       05    C$     WRITE(13,2000) J
000005       01     2000 FORMAT(1X,'TYPE=',I6)
000006       05    C$     WRITE(13,2100)(HCC1(I,J),I=1,4)
000007       01     2100 FORMAT(1X,'QUEUE LENGTH',5X,4(F10.2,3X))
000008       01     2200 FORMAT(1X,'QUEUE INPUT ',5X,4(F10.2,3X))
000009       01     2300 FORMAT(1X,'QUEUE OUTPUT',5X,4(F10.2,3X))
000010       05    C$     WRITE(13,2200)(HCC2(I,2,J),I=1,4)
000011       05    C$     WRITE(13,2300)(HCC2(I,3,J),I=1,4)
000012       01      200 CONTINUE
000013       01          RETURN
000014       01          END

******  OTHCC2  ******
```

```
****** OTPUT ******
000001  00        SUBROUTINE OTPUT
000002  00            INCLUDE COMMON,LIST
000003  00        PRINT 99,TNOW
000004  00     99 FORMAT (1H1,'*****SUBROUTINE OTPUT CALLED AT TNOW = ',F5.0 ,
000005  00       2 '*****'//)
000006  00        WRITE(6,100)
000007  00    100 FORMAT(1X,'THE THTRSM IS')
000008  00        DO 1000 I=1,NUNITS
000009  00   1000 WRITE(6,110)(THTRSM(I,J),J=1,3)
000010  00    110 FORMAT (1H , 8(F9.3,1X) )
000011  00        WRITE(6,120)
000012  00    120 FORMAT(1X,'THE UNIT AUTHORIZE STRENGTHS ARE')
000013  00        DO 1100 I=1,NUNITS
000014  00   1100 WRITE(6,110)((UNITAU(I,J,K),J=1,NTYPES),K=1,2)
000015  00        WRITE(6,130)
000016  00    130 FORMAT(1X,'THE ONHAND UNIT STRENGTH IS')
000017  00        DO 1200 I=1,NUNITS
000018  00   1200 WRITE(6,110)((UNITCH(I,J,K),J=1,NTYPES),K=1,2)
000019  00        WRITE(6,140)(COMRAT(I),I=1,NTYPES),(NCMRAT(I),I=1,NTYPES),(
000020  00       1PERRAT(I),I=1,NTYPES),(UNREP(I),I=1,NTYPES),(DAMRAT(I),I=1,NTYPES)
000021  00       2,(ABRAT(I),I=1,NTYPES)
000022  00    140 FORMAT(1X,'THE COMBAT LOSS RATE IS',F10.5/1X,'THE NONCOMBAT LOSS R
000023  01       1ATE IS',F10.5/1X,'THE PERSON'
000024  01       2'NEL LOSS RATE IS',F10.5/'THE UNREPAIRABLE RATE IS',F10.5/1X,
000025  01       3 'THE DAMAGE RATE IS',F10.5/1X,'THE ABANDONMENT RATE IS',F10.5)
000026  00        WRITE(6,150)((REPRAT(J,I),I=1,NTYPES),J=1,2),(PWRSRT(I),I=1,NTYPES
000027  00       1)
000028  00    150 FORMAT(1X,'THE REPAIR RATE IS',F35.5,2X,F10.2/1X,'THE WAR RESERVES
000029  00       1SUPPLY RATE IS',F10.2)
000030  00        WRITE(6,160)
000031  00    160 FORMAT(1X,'THE WAR RESERVES STOCKS ARE')
000032  00        WRITE(6,110)(PWRS(I),I=1,NTYPES),(PWRSIN(I),I=1,NTYPES)
000033  00        WRITE(6,170)
000034  00    170 FORMAT(1X,'THE THEATER SUPPLIES ARE')
000035  00        WRITE(6,110)(TSTOCK(1,J),J=1,NTYPES)
000036  00        WRITE (6,110) (TSTOCK(2,J),J=1,NTYPES)
000037  00        WRITE(6,180)
000038  00    180 FORMAT(1X,'THE THEATER PERSONNEL POOL')
000039  00        WRITE(6,110)(TPERS(1,J),J=1,NTYPES),(PERSIN(I),I=1,NTYPES)
000040  00        WRITE (6,110) (TPERS(2,J),J=1,NTYPES)
000041  00        WRITE(6,190)DLYSTA,DLYCON,DLYPOM,DLYHOS,DLYPER,DLYSUP
000042  00    190 FORMAT(1X,'ONSTATION, PONCUS, CONUS, HOSPITAL, PERSONNEL RESUPPLY,
000043  00       1 AND RESUPPLY DELAYS'/1X,10(F6.1,1X))
000044  00        WRITE(6,200)
000045  00    200 FORMAT(1X,'DS CAPACITY LOOK UP TABLE')
000046  00        DO 1300 I=1,NMATE
000047  00   1300 WRITE(6,110)(NACAPT(I,J),J=1,3)
000048  02        CALL CHECK(2)
000049  00        WRITE (6,10) TNOW
000050  00     10 FORMAT (' THE SIMULATION HAS ENDED AT',F10.1)

000051  00        PRINT 2020,(SDEC(K),K=1,6)
000052  02   2020 FORMAT (' THE VALUES OF THE DECISION VARIABLES ARE',/,6(2X,F10.3))
000053  00        PRINT 2021,TANK,OS
000054  02   2021 FORMAT (' THE NUMBER OF COMMITED TANK DAYS IS ',F10.3,/
000055  00       +' AND THE SIZE OF A OS UNIT IS',F10.0)
000056  00        RETURN
000057  00        END

****** OTPUT ******
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```
****** PROC ******

0001      COMMON PROC
0002      C
0003            PARAMETER U=35,  T=3,  M=T+2,  S=20,  D=60
0004      C
0005      C U IS THE NUMBER OF UNITS IN THE INPUT DECK:  U=NUNITS
0006      C T IS THE NUMBER OF TYPES IN EACH UNIT OF THE INPUT DECK:  T=NTYPES
0007      C S IS THE NUMBER OF ROWS IN THE LOOK-UP TABLE:  S=NMATE
0008      C D THE NUMBER OF DAYS THE SIMULATION IS RUN FOR:  D=KDAY
0009      C THESE PARAMETERS MUST BE CHANGED IF THE NUMBER OF UNITS OR TYPES
0010      C  IS CHANGED, AND THEN ALL SUB-PROGRAMS MUST BE RECOMPILED.
0011      C
0012            COMMON / ARRAY1 / ABRAT(T),
0013           1 BACKLG(U,T),     BACKPL(U,T),    BUFPRM(T),
0014           2 CONRAT(T),       CONLOS(U,T),    CREWAV(U,T),    CREWLS(U,T),
0015           3 CRWLSR(T),       CRWPER(T),
0016           4 DAMRAT(T),       DAYLOS(T),      DSCONC(T),      DSNCM(T),
0017           5 DSREPB(T),       DSC(U,T),       DSN(U,T),
0018           6 GSCON(T),        GSNCM(T),       GSREPB(T),
0019           6 GSC(U,T),        GSN(U,T),
0020           7 HOSPER(T),       HOSPTM(T),
0021           8 MACAPT(S, M),    MAFACT(M,T),  MCC1(U,T,3,2),
0022           * MCC2(M,3,T),
0023           9 NCMLOS(U, T),    NCMRAT(T)
0024            COMMON / ARRAY2 /
0025           1 PERFAC(T),       PERLOS( T),     PERRAT(T),      PERSEN(U,T),
0026           2 PERSIN(T),       PRMLOS(T),      PWRS(T),        PWRSHR(T),
0027           3 PWRSIN(T),       PWRSOU(T),      PWRSRT(T),
0028           4 REPAIR(M,T),     REPOUT(T),      REPRAT(2,T),
0029           5 RESUP(U,T,2),    RESUPA(U,T,2), RESUPO(U,T,2),
0030           6 SUPFAC(T),       SUPSEN(U,T),
0031           7 TBCKLG(T),       TBCKPL(T),      TCON(T),        TMTRSH(U,4),
0032           8 TLOS(T),         TNCM(T),        TOTLOS(U,T),    TOTPER(T),
0033           9 TOTSTK(T),       TPERLS(T),      TPERS(2,T),     TPRSEN(T),
0034           1 TSPNOT(T),       TSPSEN(T),      TSTOCK(2,T),    TRANST(T),
0035           2 UNECON(T),       UNECRT(T),      UNITAU(U,T,2), UNITOH(U,T,2),
0036           3 UNREP(T),  UNTMAC(U,T)
0037      C
0038      C
0039            COMMON / SSAVE / DPVAR1(7),DPVAR2(6),DPVAR3(4),DPVAR4(4),DPVAR5(3)
0040      C
0041            COMMON / CHECK / HOSP(T), OTGS(T), OTRDS(T), OTUNDS(T),
0042           1   PERARR(T), PTRANS(T), RDSIN(T), SUPTOT(T), TBSIN(T),
0043           2   UNDSIN(T), WARRES(T), IN(11,D,T), OUT(21,D,T), DELTA(3,D,T),
0044           3   QCAP(3,D,T)
0045      C
0046            COMMON / TOTS / NUNITS, NTYPES, NMAINT, NMATYP, NSPUNT, NSPTYP
0047      C
0048      C
0049            COMMON / NONARR /DAYPRM, DLYSTA,DLYPOM,DLYCON,
0050           1 DDAY,DLYHOS,DLYSUP,DLYPER,DLYMAI,KDAY,NMATE,
0051           2 PERMS
0052      C
0053      C
0054            COMMON / GCOM1/ ATRIB(25), JEVNT, MFA, MFE(100),MLE(100),MSTOP,
0055           2 NCROR,NNAPQ,NMAPT,NMATR,NMFIL,NMQ(100),NMTRY,MPRNT,
0056           3 PPARM(50,4),TNOW,TTBEG,TTCLR,TTFIN,TTRIB(25),TTSET
0057      C
0058            COMMON /GCOM3/ AAERR,DTMAX,DTMIN,DTSAV,IITES,LLERR,LLSAV,LLSEV,RREG
0059           1RR,TTLAS,TTSAV
0060      C
0061            COMMON/GOPT1/IPNT, OPTNUM,JOLD,NNOLD,ODOLD(60,7),NNDEC,LLDEC(5,2) GOPT1  1
0062           1,NOPTNR,PAVG,LNBP,LUBP,LTBP,LTBP,LSPT,LUSP,LISP,LOPT,NNNX,SSTPS,  GOPT1  2
0063           2TTCAR,DIRECT,TTFST,TTBTW,DDEC(6)                                  GOPT1  3
0064      C
0065            COMMON / TANKS / TANK,GS,GSS
0066            EQUIVALENCE (DDEC(1),RELOC), (DDEC(2),GSUS)
0067      C
0068            COMMON QSET(1000)
0069            EQUIVALENCE (NSET(1),QSET(1))
0070      C
0071            REAL MAFACT,MACAPT,MCMLOS,MCMRAT,MCC1,MCC2,IN
0072       1976 FORMAT ()
0073       1977 FORMAT (10G10.4)
0074       1978 FORMAT (10I5)
0075       1979 FORMAT ()
0076       END

****** PROC ******
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******  RESERV  ******

000001       00          SUBROUTINE RESERV
000002       00          INCLUDE COMMON.LIST
000003       01    C$     WRITE (13, 1971)TNOW
000004       00     1971 FORMAT (' *****SUBROUTINE RESERV CALLED AT ',F10.1,' *****')
000005       00    C
000006       00    C THIS SUBROUTINE HANDLES RESUPPLY OF CONUS RESERVE PERSONNEL TO THEATER
000007       00    C PERSONNEL POOLS
000008       00    C
000009       00          N=IFIX(ATRIB(7))
000010       01    C$     WRITE (13,1979) PERSIN(N)
000011       00          PERSIN(N)=PERSIN(N)+ATRIB(5)
000012       01    C$     WRITE (13,1979) PERSIN(N),ATRIB(5)
000013       00          RETURN
000014       00          END

******  RESERV  ******



******  SSAVE  ******

000001       27          SUBROUTINE SSAVE
000002       27          INCLUDE COMMON.LIST
000003       28          NAMELIST /OUTPUT/ DPVAR1,DPVAR2,DPVAR3,DPVAR4,DPVARS
000004       27          WRITE (13, 1971)TNOW
000005       27     1971 FORMAT (' *****SUBROUTINE SSAVE CALLED AT ',F10.1,' *****')
000006       27    C
000007       27    C ZERO LOCAL VARIABLES
000008       27    C
000009       27          DO 1 I=1,4
000010       31          DPVAR4(I)=0.
000011       27          DPVAR1(I)=0.
000012       27          DPVAR2(I)=0.
000013       27        1 DPVAR3(I)=0.
000014       27          DPVAR1(5)=0.
000015       27          DPVAR2(5)=0.
000016       27          DPVAR1(6)=0.
000017       30          DPVAR2(6)=0.
000018       27          DPVAR1(7)=0.
000019       28          DPVARS(1)=0.
000020       28          DPVARS(2)=0.
000021       28          DPVARS(3)=0.
000022       27    C
000023       27    C GRAPH NUMBER 1 BREAKS THE COMMITTED HARDWARE INTO ITS LOCATION IN THE
000024       27    C  MODEL.
000025       27    C
000026       27          DO 100 J=1,NTYPES
000027       27          DPVAR1(1)= PRNLOS(J)
000028       28    C DPVAR1(1) IS THE CUMULATIVE NUMBER OF PERMANENT EQUIPMENT LOSSES.
000029       27    C
000030       27    C
000031       27          DPVAR1(2)=DPVAR1(2)+TSTOCK(1,J)+TSTOCK(2,J)
000032       27    C DPVAR1(2) IS THE QUANTITY OF HARDWARE IN THE THEATER STOCKS.
000033       27    C
000034       27          DPVAR1(3)=DPVAR1(3)+PWRS(J)
000035       27    C DPVAR1(3) IS THE QUANTITY OF EQUIPMENT IN WAR RESERVES.
000036       27    C
000037       29          DO 201 I=1,NUNITS
000038       28    C
000039       28          DPVAR1(4)=DPVAR1(4)+UNITAU(I,J,1)
000040       28    C DPVAR1(4) IS THE LEVEL OF AUTHORIZED EQUIPMENT.  IT SHOULD BE A CONSTANT.
000041       28    C
000042       28          DPVAR1(5)=DPVAR1(5)+UNITOH(I,J,1)
000043       28    C DPVAR1(5) IS THE QUANTITY OF COMMITTED HARDWARE.
000044       28    C
000045       29     201  CONTINUE
000046       28          DPVAR1(6)= UNECON(J)
000047       28    C DRVAR1(6) IS THE QUANTITY OF HARDWARE THAT IS UNECONOMICALLY REPAIRABLE.
000048       27    C
000049       28          DPVAR1(7)=TRANST(J)
000050       27    C
000051       28    C  DPVAR1(7) IS THE NUMBER OF TANKS IN TRANSIT
000052       27    C
000053       27      100 CONTINUE
000054       27          CALL GPLOT(DPVAR1,TNOW,1)
000055       27    C
000056       27    C GRAPH NUMBER 2 BREAKS DOWN THE ORIGIN OF COMMITTED UNITS.
000057       27    C
000058       27          DO 101 I=1,NUNITS
000059       30          IF (TMTRSN(I,2) - 1) 112,113,114
000060       27    C

******  SSAVE  ******
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```
****** SSAVE ******

000061      27   C IF (-) THEN UNIT HAS NOT ARRIVED.
000062      27   C IF (0) THEN UNIT IS  COMMITTED.
000063      27   C IF (+) THEN UNIT IS  COMMITTED AND HAS AN ON STATION COMBAT UNIT.
000064      27   C
000065      27     112 DPVAR2(1)=DPVAR2(1)+ UNITOW(I,1,1)
000066      27   C DPVAR2 IS THE QUANTITY OF ON STATION UNITS.
000067      27   C
000068      27         GOTO 115
000069      30     113 DPVAR2(2)=DPVAR2(2)+ UNITOW(I,1,1)
000070      27   C DPVAR2(2) IS THE QUANTITY OF POMCUS UNITS.
000071      27   C
000072      27         GOTO 115
000073      27     114 DPVAR2(3)=DPVAR2(3)+ UNITOW(I,1,1)
000074      27   C DPVAR2(3) IS THE QUANTITY OF CONUS UNITS.
000075      27   C
000076      30     115 IF (THTRSH(I,1).EQ.2) DPVAR2(5) = DPVAR2(5)+1
000077      30         IF (THTRSH(I,1).EQ.2) DPVAR2(6) = DPVAR2(6)+UNITOW(I,1,1)
000078      30         IF (THTRSH(I,1).EQ.1) DPVAR2(4) = DPVAR2(4)+UNITOW(I,1,1)
000079      30   C DPVAR2(5) IS THE NUMBER OF COMMITTED UNITS
000080      30   C DPVAR2(6) IS THE AMT OF EQUIPMENT IN THE COMMITTED UNITS
000081      30   C DPVAR2(4) IS THE AMT OF EQUIPMENT IN UNCOMMITTED UNITS
000082      27   C
000083      27     101 CONTINUE
000084      27         CALL GPLOT(DPVAR2,TNOW,2)
000085      27   C
000086      27   C GRAPH NUMBER 3
000087      27   C
000088      28         DO 120 J=1,NTYPES
000089      28         DPVAR3(1)=DPVAR3(1)+(PRMLOS(J) - BUFPRM(J))
000090      28   C DPVAR3(1) IS THE NUMBER OF PERMANENT EQUIPMENT LOSSES BY DAY.
000091      27   C
000092      27         DO 119 I=1,NUNITS
000093      27     119 DPVAR3(2)=DPVAR3(2) + COMLOS(I,J) + NCMLOS(I,J)
000094      27   C THIS IS THE NUMBER OF TOTAL DAILY LOSSES (SEE REDEFINITION OF
000095      27   C  DPVAR3(2) BELOW).
000096      27         DPVAR3(3) = DPVAR3(3) + REPOUT(J)
000097      27   C DPVAR3(3) IS THE MAINTAINENCE RETURNS.
000098      27   C
000099      27         DPVAR3(4) = DPVAR3(4) + PWRSOU(J)
000100      27   C DPVAR3(4) IS THE WAR RESERVE ISSUES
000101      27   C
000102      27     120 CONTINUE
000103      27   C
000104      27         CALL GPLOT (DPVAR3,TNOW,3)
000105      27   C
000106      27   C GRAPH NUMBER 4
000107      27   C
000108      27         DO 116 J=1,NTYPES
000109      27         DPVAR4(1) = DPVAR4(1) + TSPSEN(J)
000110      27   C DPVAR4(1) IS THE NUMBER OF TANKS ISSUED FROM THEATER STOCKS.
000111      27   C
000112      27         DPVAR4(2) = DPVAR4(2) + TSPNOT(J)
000113      27   C DPVAR4 IS THE NUMBER OF TANKS WITHOUT A CREW AVAILABLE.
000114      27   C
000115      27         DO 116 I=1,NUNITS
000116      31         DPVAR4(3) = DPVAR4(3) + CREWAV(I,J)/9.
000117      31         DPVAR4(4)=DPVAR4(4)+BACKLG(I,J)
000118      31     116   CONTINUE
000119      27   C DPVAR4(3) IS THE AVAILABLE CREW.
000120      27   C
000121      28   C ***********************************
000122      28   C ************  GRAPH 5 **************
000123      28   C ***********************************
000124      28         DO 6 I17=1,NUNITS
000125      28         DO 6 J17=1,NTYPES
000126      28   C
000127      29         DPVAR5(1) = DPVAR5(1) + NCC1(I17,J17,1,1) + NCC1(I17,J17,1,2)
000128      28   C DPVAR5(1) IS THE QUEUE LENGTH FOR DIVISION MAINTAINENCE.
000129      28   C SEE PROGRAM UNMAIN FOR THE DEFINISTION OF THE NCC1 VARIABLE.
000130      28   C
000131      29         DPVAR5(2) = DPVAR5(2) + NCC2(1,1,J17) + NCC2(3,1,J17)
000132      28   C DPVAR5(2) IS THE QUEUE LENGTH FOR REAR DS MAINTAINENCE.
000133      28   C SEE PROGRAM MAINT FOR THE DEFINITION OF THE NCC2 VARIABLE.
000134      28   C
000135      29     6   DPVAR5(3) = DPVAR5(3) + NCC2(2,1,J17) + NCC2(4,1,J17)
000136      28   C DPVAR5(3) IS THE QUEUE LENGTH FOR DS MAINTAINENCE.
000137      28   C SEE PROGRAM MAINT FOR THE DEFINITION OF THE NCC2 VARIABLE.
000138      28   C
000139      29         CALL GPLOT(DPVAR5,TNOW,5)
000140      27         CALL GPLOT(DPVAR4,TNOW,4)

****** SSAVE ******
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******  SSAVE  ******
000141       27   C
000142       27          CALL COLCT(DPVAR1(1),1)
000143       27          CALL COLCT(DPVAR1(2),2)
000144       27          CALL COLCT(DPVAR1(3),3)
000145       27          CALL COLCT(DPVAR1(4),4)
000146       27          CALL COLCT(DPVAR1(5),5)
000147       27          CALL COLCT(DPVAR1(6),6)
000148       27          CALL COLCT(DPVAR1(7),7)
000149       27   C
000150       27          CALL COLCT(DPVAR2(1),8)
000151       27          CALL COLCT(DPVAR2(2),9)
000152       27          CALL COLCT(DPVAR2(3),10)
000153       27          CALL COLCT(DPVAR2(4),11)
000154       27          CALL COLCT(DPVAR2(5),12)
000155       27   C
000156       27   C WRITE OUT THE VARIABLES TO CHECK THEIR ACCURACY.
000157       27   C
000158       27          WRITE (13,OUTPUT)
000159       27   C
000160       27   C THAT'S ALL FOLKS
000161       27   C
000162       27          RETURN
000163       27          END
******  SSAVE  ******
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```
******  TMSTOK  ******
000001       00          SUBROUTINE TMSTOK(DELAY1,DELAY2)
000002       00   C
000003       00   C THIS SUBROUTINE HANDLES THE THEATER STOCKS OF BOTH PERSONNEL AND EQUIPMENT
000004       00   C BACKLOG ORDERS ARE MAINTAINED FOR EACH UNIT ORDERS ARE FILLED IN PROPORTION
000005       00   C TO THE AVAILABLE SUPPLIES OR PERSONNEL. EQUIPMENT SUPPLIES ARE ONLY FILED FOR
000006       00   C A UNIT IF THERE ARE ENOUGH PERSONNEL AVAILABLE TO MAN THE EQUIPMENT.
000007       00   C ARRIVALS OF NEW SUPPLIES TO THEATER STOCK ARE HANDLED AFTER THEATER STOCKS
000008       00   C HAVE ATTEMPTED TO RESUPPLY THE UNIT.  FINAL, A UNIT'S NEW REQUEST FOR SUPPLIES
000009       00   C UNIT BE TOTALED INTO THE UNITS BACK ORDER  TOTAL AS THE FINAL TASK IN THE
000010       00   C SUBROUTINE
000011       00   C
000012       00          INCLUDE COMMON,LIST
000013       00   C
000014       00   C TOTAL THEATER'S AVAILABLE SUPPLIES AND PERSONNEL
000015       00   C
000016       02   C$      WRITE (13, 1971)TNOW
000017       00    1971 FORMAT (' ***>>SUBROUTINE TMSTOK/ CALLED AT ',F10.1,' *****')
000018       00   C
000019       00          DO 400 J=1,NTYPES
000020       00          TOTSTK(J)=TSTOCK(1,J)+TSTOCK(2,J)
000021       00      400 TOTPER(J)=TPERS(1,J)+TPERS(2,J)
000022       02   C$      WRITE (13,1000) TOTSTK(1), TOTPER(1)
000023       00    1000 FORMAT (1X, 'TOTSTK = ', F10.4, 'TOTPER =' , F10.4)
000024       00   C
000025       00   C COMPUTE THE BACKLOG OF SUPPLY AND PERSONNEL ORDERS
000026       00   C
000027       00          DO 410 J=1,NTYPES
000028       00          TBCKLG(J)=0.01
000029       00          TBCKPL(J)=0.01
000030       00          TSPNOT(J) = 0.
000031       00          DO 410 I=1,NUNITS
000032       00          TBCKLG(J)=TBCKLG(J)+BACKLG(I,J)
000033       00      410 TBCKPL(J)=TBCKPL(J)+BACKPL(I,J)
000034       02   C$      WRITE (13,1010) TBCKLG(1),TBCKPL(1)
000035       00    1010 FORMAT (1X,'TBCKLG= ', F10.4, 'TBCKPL = ' ,F10.4)
000036       00          DO 420 J=1,NTYPES
000037       00   C
000038       00   C CALCULATE THE PROPORTION OF A BACK ORDER TO BE FILLED AND INITIAL THE SUPPLIES
000039       00   C SENT ON THIS CYCLE TOTAL TO ZERO
000040       00   C
000041       00          PERFAC(J)=AMIN1(TOTPER(J)/TBCKPL(J),1.0)
000042       00          TPRSEN(J)=0.0
000043       00          SUPFAC(J)=AMIN1(TOTSTK(J)/TBCKLG(J),1.0)
000044       02   C$      WRITE (13,1020) SUPFAC(1), PERFAC(1)
000045       00    1020 FORMAT (1X,' SUPFAC = ' ,F10.4, 'PERFAC = ',F10.4)
000046       00          TSPSEN(J)=0.0
000047       00          DO 420 I=1,NUNITS
000048       00   C
000049       00   C CALCULATE THE PERSONNEL ORDER REFILLED AND UPDATE THE APPROPRIATE  TOTALS
000050       00   C

******  TMSTOK  ******
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```
******  THSTOK  ******
000051       00          PERSEN(I,J)=PERFAC(J)*BACKPL(I,J)
000052       00          BACKPL(I,J)=BACKPL(I,J)-PERSEN(I,J)
000053       00          TPRSEN(J)=TPRSEN(J)+PERSEN(I,J)
000054       00    C
000055       00    C COMPUTE THE EQUIPMENT RESUPPLIES SENT TO UNITS AND UPDATE TOTALS
000056       00    C
000057       00    C
000058       00          SUPLY1= SUPFAC(J) + BACKLG(I,J)
000059       00          SUPLY2= CREWAV(I,J)/CRWPER(J)
000060       00          SUPSEN(I,J)=AMIN1(SUPFAC(J)+BACKLG(I,J),CREWAV(I,J)/CRWPER(J))
000061       00          SUPNOT=0.
000062       00          IF (SUPLY1.LT.SUPLY2) GOTO 415
000063       00          SUPNOT=SUPLY1-SUPLY2
000064       02    C$     WRITE (13,2000) I,J,SUPNOT
000065       00     2000 FORMAT (1X,' UNIT= ',I3, ' TYPE= ',I3, ' SUPPLIES NOT SENT DUE TO
000066       00         2LACK OF CREW = ', F10.4)
000067       00      415 TSPNOT(J) = TSPNOT(J) + SUPNOT
000068       00          CREWAV(I,J)=CREWAV(I,J)-SUPSEN(I,J)*CRWPER(J)
000069       00          TSPSEN(J)=TSPSEN(J)+SUPSEN(I,J)
000070       02    C$     WRITE (13,1030) I,SUPSEN(I,1), PERSEN(I,J)
000071       00     1030 FORMAT (1X, 'UNIT = ',I3 , 'SUPSEN = ', F10.4,
000072       00         + 'PERSEN = ', F10.4)
000073       00      420 BACKLG(I,J)=BACKLG(I,J)-SUPSEN(I,J)
000074       00    C
000075       00    C SCHEDULE THE ARRIVAL OF THE SUPPLIES SENT TO THE UNITS AFTER A DELAY OF DELAY1
000076       00    C
000077       02    C$     WRITE (13,1040) TSPSEN(1),TPRSEN(1)
000078       00     1040 FORMAT (1X, 'TSPEN = ', F10.4, 'TPRSEN = ', F10.4)
000079       00          ATRIB(1)=TNOW+DELAY1
000080       00          ATRIB(2)=5.0
000081       00          DO 430 J=1,NTYPES
000082       00          DO 430 I=1,NUNITS
000083       00          ATRIB(3)=FLOAT(I)
000084       00          ATRIB(4)=SUPSEN(I,J)
000085       00          ATRIB(5)=0.0
000086       00          ATRIB(6)=0.0
000087       00          ATRIB(7)=FLOAT(J)
000088       00      430 IF(ATRIB(4).GT.0.0)CALL FILEM(1)
000089       00    C
000090       00    C SCHEDULE ARRIVAL OF REPLACEMENT PERSONNEL AFTER DELAY DELAY2
000091       00    C
000092       00          ATRIB(1)=TNOW+DELAY2
000093       00          ATRIB(4)=0.0
000094       00          DO 440 J=1,NTYPES
000095       00          DO 440 I=1,NUNITS
000096       00          ATRIB(3)=FLOAT(I)
000097       00          ATRIB(5)=PERSEN(I,J)
000098       00          ATRIB(7)=FLOAT(J)
000099       00      440 IF(ATRIB(5).GT.0.0)CALL FILEM(1)
000100       00    C
000101       00    C REDUCE THEATER STOCKS BY THE SUPPLIES SENT TO UNITS
000102       00    C
000103       00          DO 450 J=1,NTYPES
000104       00          TRANST(J)=TRANST(J)+TSPSEN(J)
000105       01          PTRANS(J)=PTRANS(J)+TPRSEN(J)
000106       00    C
000107       00    C CHECK TO SEE IF REPAIRED THEATER STOCKS CAN HANDLE ORDER
000108       00    C
000109       00          IF(TSPSEN(J).GT.TSTOCK(2,J))GO TO 441
000110       00          TSTOCK(2,J)=TSTOCK(2,J)-TSPSEN(J)
000111       00          GO TO 442
000112       00    C
000113       00    C DEPLETE REPAIR THEATER STOCKS BEFORE DEPLETING WAR RESERVES
000114       00    C
000115       00      441 TSTOCK(1,J)=TOTSTK(J)-TSPSEN(J)
000116       00          TSTOCK(2,J)=0.0
000117       00    C
000118       00    C CHECK TO SEE IF HOSPITALIZED RETURNEES CAN HANDLE PERSONNEL ORDERS
000119       00    C
000120       00      442 IF(TPRSEN(J).GT.TPERS(2,J))GO TO 443
000121       00          TPERS(2,J)=TPERS(2,J)-TPRSEN(J)
000122       00          GO TO 450
000123       00    C
000124       00    C DEPLETE HOSPITAL RETURNED PERSONNEL BEFORE DEPLETING CONUS RESUPPLY PERSONNEL
000125       00    C
000126       00      443 TPERS(1,J)=TOTPER(J)-TPRSEN(J)
000127       00          TPERS(2,J)=0.0
000128       00      450 CONTINUE
000129       00          DO 460 J=1,NTYPES
000130       00    C

******  THSTOK  ******
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```
******  THSTOK  ******

000131       00   C RESUPPLY THEATER STOCKS
000132       00   C
000133       02   C$      WRITE (13,1050) (TPERS(I,1),I=1,2), (TSTOCK(I,1), I=1,2)
000134       00    1050 FORMAT (1X, 'TPERS1 = ', F10.4, 'TPERS2 = ', F10.4,
000135       00       + 'TSTOCK1 = ',F10.4, 'TSTOCK2 = ', F10.4 )
000136       00         TPERS(1,J)=TPERS(1,J)+PERSIN(J)
000137       00         TPERS(2,J)=TPERS(2,J)+HOSPIN(J)
000138       01         PERARR(J)=PERARR(J)+PERSIN(J)
000139       01         HOSP(J)=HOSP(J)-HOSPIN(J)
000140       00         TSTOCK(1,J)=TSTOCK(1,J)+PWRSOU(J)
000141       00     460 TSTOCK(2,J)=TSTOCK(2,J)+REPOUT(J)
000142       02   C$      WRITE (13,1060) PERSIN(1),HOSPIN(1),PWRSOU(1),REPOUT(1)
000143       00    1060 FORMAT (1X, 'PERSIN = ', F10.4,'HOSPIN = ',F10.4, 'PWRSOU=',
000144       00       + F10.4, 'REPOUT = ',F10.4)
000145       02   C$      WRITE (13,1050) (TPERS(I,1),I=1,2),(TSTOCK(I,1),I=1,2)
000146       00         DO 470 J=1,NTYPES
000147       00         DO 470 I=1,NUNITS
000148       00   C
000149       00   C UPDATE UNIT'S BACKLOG FILES
000150       00   C
000151       02   C$      WRITE (13,1070) I,J,BACKLG(I,J),BACKPL(I,J)
000152       00    1070 FORMAT (1X, 'UNIT = ', I3, 'TYPE = ',I3, ' BACKLG = ',
000153       00       + F10.4, ' BACKPL = ',F10.4)
000154       00         BACKLG(I,J)=BACKLG(I,J)+RESUP(I,J,1)
000155       00         BACKPL(I,J)=BACKPL(I,J)+RESUP(I,J,2)
000156       02   C$      WRITE (13,1070) I,J,BACKLG(I,J),BACKPL(I,J)
000157       00     470 CONTINUE
000158       00   C
000159       00   C REINITIALIZE PERSIN AND HOSPIN TO ZERO
000160       00   C
000161       00         DO 490  I=1,NTYPES
000162       00            PERSIN(I)=0.0
000163       00     490    HOSPIN(I)=0.0
000164       00         RETURN

000165       00         END

******  THSTOK  ******
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******  UNITDS  ******

000001       02         SUBROUTINE UNITDS
000002       02   C
000003       02   C THIS SUBROUTINE HANDLES THE ARRIVAL OF DS MAINTENANCE TO
000004       02   C COMBAT UNITS.
000005       02   C
000006       02         INCLUDE COMMON.LIST
000007       02         N=IFIX(ATRIB(3))
000008       02         M=IFIX(ATRIB(4))
000009       02   C
000010       02   C ATRIB(3) IS THE COMBAT UNIT
000011       02   C ATRIB(4) IS THE LINE NUMBER OF THE SRC LOOK UP TABLE
000012       02   C
000013       02         JJ=NTYPES+2
000014       02         DO 520 J=3,JJ
000015       02         UNTMAC(N,J-2)=MACAPT(N,J)+MACAPT(N,2)
000016       02     520 CONTINUE
000017       06   C$     WRITE(13,1000)TNOW,N,M,(UNTMAC(N,I),I=1,NTYPES)
000018       02    1000 FORMAT(1X,'*** IN UNITDS AT',F10.2,'  ***'/
000019       02       1 1X,'UNIT=',I3,' LINE IN SRC TABLE=',I3/
000020       02       2 1X,'THE UNIT DS MAINTENANCE IS'/
000021       02       3 1X,10(F10.2,2X))
000022       02         RETURN
000023       02         END

******  UNITDS  ******
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******  UNMAIN  ******

000001       13          SUBROUTINE UNMAIN
000002       13    C
000003       13    C THIS SUBROUTINE HANDLES THE OS MAINTENANCE WHICH IS ASSOCIATED WITH
000004       13    C EACH OF COMBAT UNITS. THIS OS MAINTENANCE UNITS HAVE TWO DAY MAINTENANCE
000005       13    C QUEUE. ANY OVERFLOW FROM THESE MAINTENCE UNITS ARE PASSED ON TO REAR
000006       13    C OS MAINTENANCE UNITS. OS MAINTENANCE WILL FLOW DIRECTLY TO REAR OS
000007       13    C MAINTENANCE UNIT. THE OUTPUT OF THE COMBAT UNIT ASSOCIATED OS MAINTENANCE
000008       13    C WILL FLOW DIRECT TO THE ASSOCIATED COMBAT UNIT
000009       13    C
000010       13    C                                VARIABLES
000011       13    C
000012       13    C MCC1(I,J,K,L)- THE MAINTENANCE CONTROL CENTER FOR COMBAT UNIT OS
000013       13    C                 MAINTENANCE
000014       13    C                 I- UNIT NUMBER
000015       13    C                 J- EQUIPMENT TYPE
000016       13    C                 K- 1=QUEUE LENGTH;2=QUEUE OUTPUT;3=QUEUE INPUT
000017       13    C                 L- 1=NONCOMBAT;2=COMBAT
000018       13    C OSC(I,J)-OS REPAIRABLE COMBAT LOSSES FOR THE CYCLE
000019       13    C          I=UNIT
000020       13    C          J=TYPE OF EQUIPMENT
000021       13    C OSC(I,J)- OS REPAIRABLE COMBAT LOSSES FOR THE CYCLE
000022       13    C OSN(I,J)- OS REPAIRABLE NONCOMBAT LOSSES FOR THE CYCLE
000023       13    C DSN(I,J)- DS REPAIRABLE NONCOMBAT LOSSES FOR THE CYCLE
000024       13    C UNTMAC(I,J)- COMBAT UNIT I'S TYPE J DS CAPACITY
000025       13    C
000026       13          INCLUDE COMMON.LIST
000027       13          DO 50 L=1,2
000028       13          DO 50 K=2,3
000029       13          DO 50 J=1,NTYPES
000030       13          DO 50 I=1,NUNITS
000031       13          MCC1(I,J,K,L)=0.0
000032       13    C
000033       13    C ZERO OUT SOME CYCLE TOTALS
000034       13       50 CONTINUE
000035       13          NN=14
000036       13          DO 100 I=1,NUNITS
000037       13          DO  90 J=1,NTYPES
000038       13          IF(TMTRSM(I,I).LT.1.)GO TO 100
000039       13    C
000040       13    C REMOVE UNECONOMICALLY REPAIRABLE COMBAT LOSES
000041       13    C
000042       13          UNECON(J) = UNECON(J) + COMLOS(I,J)*UNECRT(J)
000043       13          RESUP(I,J,1)=RESUP(I,J,1)+COMLOS(I,J)*UNECRT(J)
000044       13          COMLOS(I,J) = COMLOS(I,J)-COMLOS(I,J)*UNECRT(J)
000045       13    C
000046       13    C COMPUTE OS AND DS COMBAT AND NONCOMBAT LOSS TOTALS
000047       13    C
000048       13          OSC(I,J)=OSCOM(J)*COMLOS(I,J)
000049       13          OSC(I,J)=COMLOS(I,J)-OSC(I,J)
000050       13          OSN(I,J)=OSNCM(J)*NCMLOS(I,J)
000051       13          DSN(I,J)=NCMLOS(I,J)-OSN(I,J)
000052       13       90 CONTINUE
000053       16     CS      WRITE(13,9000) I,J
000054       13      9000 FORMAT(1X,'UNIT ',I3,' TYPE ',I3,' OS AND OS LOSS TOTALS')
000055       16     CS      WRITE(13,9010)(OSC(I,J),J=1,NTYPES)
000056       13      9010 FORMAT(1X,'OS COMBAT'/12(1X,F9.2))
000057       16     CS      WRITE(13,9020)(DSC(I,J),J=1,NTYPES)
000058       13      9020 FORMAT(1X,'DS COMBAT'/12(1X,F9.2))
000059       16     CS      WRITE(13,9030)(OSN(I,J),J=1,NTYPES)
000060       13      9030 FORMAT(1X,'OS NONCOMBAT'/12(1X,F9.2))
000061       16     CS      WRITE(13,9040)(DSN(I,J),J=1,NTYPES)
000062       13      9040 FORMAT(1X,'DS NONCOMBAT'/12(1X,F9.2))
000063       13       100 CONTINUE
000064       13    C
000065       13    C  COMPUTE THE OUTPUT OF THE UNIT'S MAINTENANCE QUEUE
000066       13    C
000067       16     CS      WRITE(13,9045)
000068       13      9045 FORMAT(1X,' INITIAL MCC1')
000069       13          CALL OTMCC1
000070       13          DO 200 J=1,NTYPES
000071       13          DO 200 I=1,NUNITS
000072       13          IF(TMTRSM(I,1).LE.0.)GO TO 200
000073       13          REPCAP=UNTMAC(I,J)
000074       13          IF(REPCAP.EQ.0.0) GOTO 200
000075       13    C
000076       13    C OUTPUT REPAIR NONCOMBAT LOSSES FIRST
000077       13          MCC1(I,J,2,1)=MIN(REPCAP/MAFACT(I,J),MCC1(I,J,1,1),
000078       13         1 CREWAV(I,J)/CRWPER(J))
000079       13          CREWAV(I,J)=CREWAV(I,J)-MCC1(I,J,2,1)*CRWPER(J)
000080       13          OTUNDS(J)=OTUNDS(J)+MCC1(I,J,2,1)
000081       13    C
******  UNMAIN  ******
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****** UNMAIN ******
000082       13   C INCREASE CUMMULATIVE UNIT DS MAINT INPUT TOTAL
000083       13   C
000084       17         REPCAP=REPCAP-MCC1(I,J,2,1)*MAFACT(1,J)
000085       13         UNITOM(I,J,1)=UNITOM(I,J,1)+MCC1(I,J,2,1)
000086       13         MCC1(I,J,1,1)=MCC1(I,J,1,1)-MCC1(I,J,2,1)
000087       13         IF(REPCAP.LE.0.0)GOTO 200
000088       13   C
000089       13   C OUTPUT REPAIRABLE COMBAT LOSSES
000090       13   C
000091       13         MCC1(I,J,2,2)=MIN(REPCAP/MAFACT(3,J),MCC1(I,J,1,2)*
000092       13        1 CREWAV(I,J)/CRWPER(J))
000093       13         CREWAV(I,J)=CREWAV(I,J)-MCC1(I,J,2,2)*CRWPER(J)
000094       13         OTUNDS(J)=OTUNDS(J)+MCC1(I,J,2,2)
000095       13   C
000096       13   C INCREASE CUMMULATIVE UNIT DS MAINT INPUT TOTAL
000097       13   C
000098       13         UNITOM(I,J,1)=UNITOM(I,J,1)+MCC1(I,J,2,2)
000099       13         MCC1(I,J,1,2)=MCC1(I,J,1,2)-MCC1(I,J,2,2)
000100       13     200 CONTINUE
000101       16   C$      WRITE(13,9080)
000102       13    9050 FORMAT(1X,'MCC1 AFTER QUEUE PROCESSING')
000103       13         CALL OTMCC1
000104       13   C
000105       13   C INCREASE THE QUEUES WITH THE CURRENT CYCLE LOSSES IF POSSIBLE
000106       13   C
000107       13         DO 300 J=1,NTYPES
000108       13         DO 300 I=1,NUNITS
000109       13         IF(TMTBSM(I,1).LE.0.)GO TO 300
000110       13         REPCAP=2.0*UNTMAC(I,J)
000111       13         IF(REPCAP.EQ.0.0)GO TO 300
000112       13         REPCAP=REPCAP-MCC1(I,J,1,1)*MAFACT(1,J)-MCC1(I,J,1,2)*MAFACT(3,J)
000113       13         IF(REPCAP.LE.0.0) GO TO 300
000114       13         MCC1(I,J,3,1)=MIN(REPCAP/MAFACT(1,J),DSN(I,J))
000115       13         DSN(I,J)=DSN(I,J)-MCC1(I,J,3,1)
000116       13         MCC1(I,J,1,1)=MCC1(I,J,1,1)+MCC1(I,J,3,1)
000117       17         REPCAP=REPCAP-MCC1(I,J,3,1)*MAFACT(1,J)
000118       13         UNDSIN(J)=UNDSIN(J)+MCC1(I,J,3,1)
000119       13   C
000120       13   C INCREASE UNIT DS MAINT OUTPUT TOTAL (CUMMULATIVE)
000121       13   C
000122       13         IF(REPCAP.LE.0.0) GO TO 300
000123       13         MCC1(I,J,3,2)=MIN(REPCAP/MAFACT(3,J),DSC(I,J))
000124       13         DSC(I,J)=DSC(I,J)-MCC1(I,J,3,2)
000125       13         MCC1(I,J,1,2)=MCC1(I,J,1,2)+MCC1(I,J,3,2)
000126       13         UNDSIN(J)=UNDSIN(J)+MCC1(I,J,3,2)
000127       13   C
000128       13   C INCREASE UNIT DS MAINT OUTPUT TOTAL (CUMMULATIVE)
000129       13   C
000130       13     300 CONTINUE
000131       16   C$      WRITE(13,9080)
000132       13    9060 FORMAT(1X,'MCC1 AFTER INPUT TO QUEUES')
000133       13         CALL OTMCC1
000134       13         RETURN
000135       13         END

****** UNMAIN ******
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****** UNSTAT ******

000001       23          SUBROUTINE UNSTAT(IDELAY)
000002       23    C THIS SUBROUTINE DETERMINES A COMBAT UNIT'S COMBAT AND NONCOMBAT LOSSES. IN
000003       23    C ADDITION THIS SUBROUTINE REORDERS NECESSARY SUPPLIES AND PERSONNEL FOR THE
000004       23    C COMBAT UNITS. THIS SUBROUTINE WILL RECEIVE ANY SUPPLIES SENT FROM THEATER
000005       23    C STOCKS
000006       23    C
000007       23          INCLUDE COMMON.LIST
000008       23    C
000009       23    C
000010       27    C$      WRITE(14,1971) TNOW
000011       23     1971 FORMAT (' *****SUBROUTINE UNSTAT CALLED AT ',F10.1,' *****')
000012       23    C
000013       23          DO 100 J=1,NTYPES
000014       23    C
000015       23    C BUFPRM(J) STORES THE LAST DAY'S PERMANENT LOSSES FOR THE GRAPHS.
000016       23    C IN SSAVE, TWO VALUES OF THE PERMANENT LOSSES ARE PRINTED.  THE FIRST
000017       23    C IS PRMLOS(J), WHICH IS A CUMULATIVE TOTAL OF THE LOSSES, CUMULATIVE-
000018       23    C LY ADDED EACH DAY.  THE SECOND IS PRMLOS(J)-BUFPRM(J), WHICH REFLECTS
000019       23    C THE NUMBER OF LOSSES PER DAY, AND IS NOT CUMULATIVE.
000020       23    C
000021       23          BUFPRM(J) = PRMLOS(J)
000022       23    C
000023       23    C INITIALIZE SOME VARIABLES USED IN COMBAT LOSS CALCULATION
000024       23    C
000025       23          NOSPER(J)=0.0
000026       23          TPERLS(J)=0.0
000027       23          DAYLOS(J)=0.0
000028       23          TNCM(J)=0.0
000029       23          TCOM(J)=0.0
000030       23          DO 100 I=1,MUNITS
000031       23          RESUP(I,J,1)=0.0
000032       23          RESUP(I,J,2)=0.0
000033       23          COMLOS(I,J)=0.0
000034       23          NCMLOS(I,J)=0.0
000035       23          CREWLS(I,J)=0.0
000036       23      100 TOTLOS(I,J)=0.0
000037       23    C
000038       23    C MAIN LOOP TO PERFORM THE CALCULATION - THE LOOP IS COMPUTE BY EQUIPMENT TYPE
000039       23    C AND BY UNIT
000040       23    C
000041       23          DO 110 J=1,NTYPES
000042       23          PERMS = PRMLOS(J)
000043       23          DO 110 I=1,NUNITS
000044       23    C
000045       23    C THE FIRST COLUMN OF THE THEATER STATUS MATRIX (THTRSM) IS USED TO
000046       23    C DETERMINE IF THE UNIT HAS NOT YET ARRIVED, IN WHICH CASE THE FOLLOWING
000047       23    C UNIT UPDATE LIST IS SKIPPED.  THE VALUES AND MEANINGS OF THTRSM(I,1)
000048       23    C ARE:
000049       23    C
000050       23    C     0=THE UNIT HAS NOT ARRIVED,
000051       23    C     1=THE UNIT WAS ARRIVED, AND
000052       23    C     2=THE UNIT IS COMMITTED.
000053       23    C
000054       23          IF(THTRSM(I,1).LT.1.0) GO TO 110
000055       23    C
000056       23    C CALCULATE A UNIT'S NONCOMBAT LOSSES AND DECREASE THE UNIT'S STRENGTH
000057       23    C APPROPRIATELY.  ALSO, UPDATE THE CURRENT CYCLE LOSS TOTALS
000058       23    C
000059       23          NCMLOS(I,J)=UNITOM(I,J,1)*NCMRAT(J)
000060       23          UNITOM(I,J,1)=UNITOM(I,J,1)-NCMLOS(I,J)
000061       23          CREWAV(I,J) = CREWAV(I,J) + NCMLOS(I,J) * CRWPER(J)
000062       23          TNCM(J)=TNCM(J)+NCMLOS(I,J)
000063       23          DAYLOS(J)=DAYLOS(J)+NCMLOS(I,J)
000064       23          TOTLOS(I,J)=NCMLOS(I,J)
000065       27    C$      WRITE(14,1000)I,NCMLOS(I,J),UNITOM(I,J,1),TOTLOS(I,J)
000066       23     1000 FORMAT(1X,'UNIT=',I2,' NCMLOS = ',F10.4,' UNITOM=',
000067       23         2 F10.0,' TOTLOS=',F10.4)
000068       23    C
000069       23    C REORDER SUPPLIES TO REPLACE NONCOMBAT LOSSES
000070       23    C
000071       27    C$      WRITE(14,1010)I,RESUP(I,J,1)
000072       23     1010 FORMAT(1X,'UNIT=',I2,' RESUP=',F10.4)
000073       23    C
000074       23    C ELIMINATE THE UNREPAIRABLE LOSSES FROM THE NONCOMBAT LOSSES
000075       23    C
000076       23          PRMLOS(J)=PRMLOS(J)+NCMLOS(I,J)*UNREP(J)
000077       23          RESUP(I,J,1)=RESUP(I,J,1)+NCMLOS(I,J)*UNREP(J)
000078       23          NCMLOS(I,J)=NCMLOS(I,J)-NCMLOS(I,J)*UNREP(J)
000079       27    C$      WRITE(14,1020)PRMLOS(J),NCMLOS(I,J)
000080       23     1020 FORMAT(1X,'PRMLOS=',F10.4,' NCMLOS=',F10.4)
000081       23    C
000082       23    C IF THE UNIT IS UNCOMMITTED OR IF IT IS PRIOR TO DDAY DO NOT CALCULATE
000083       23    C COMBAT LOSSES
000084       27    C$      WRITE (14,1979) THTRSM(I,1),DDAY
000085       23    C
****** UNSTAT ******
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****** UNSTAT ******

000086       23          IF(THTRSH(I,1).LT.2.0 .OR. DDAY.GT.TNOW)GO TO 105
000087       23    C
000088       23    C CALCULATE UNIT COMBAT LOSSES OF BOTH EQUIPMENT AND PERSONNEL. ADJUST THE
000089       23    C UNIT'S STRENGTH APPROPRIATELY AND UPDATE THE CURRENT CYCLE CUMULATIVE LOSS
000090       23    C TOTALS.
000091       23    C
000092       23          COMLOS(I,J)=UNITOH(I,J,1)*COMRAT(J)
000093       23          UNITOH(I,J,1)=UNITOH(I,J,1)-COMLOS(I,J)
000094       23          CREWLS(I,J)=COMLOS(I,J)*PERRAT(J)
000095       23          UNITOH(I,J,2)=UNITOH(I,J,2)-CREWLS(I,J)
000096       23          TOTLOS(I,J)=TOTLOS(I,J)+COMLOS(I,J)
000097       23          DAYLOS(J)=DAYLOS(J)+COMLOS(I,J)
000098       23          TPERLS(J)=TPERLS(J)+CREWLS(I,J)
000099       23          TCOM(J) = TCOM(J) + COMLOS(I,J)
000100       27    C$     WRITE(14,1030)I,COMLOS(I,J),CREWLS(I,J),UNITOH(I,J),UNITOH(I,J,2)
000101       23     1030 FORMAT(1X,'UNIT=',I2,' COMLOS=',F10.4,' CREWLS=',F10.4,' UNITOH1='
000102       23         1,F10.4,' UNITOH2=',F10.4)
000103       23    C
000104       23    C REORDER LOST PERSONNEL AND LOST EQUIPMENT
000105       23    C
000106       23          RESUP(I,J,2)=CREWLS(I,J)
000107       23    C
000108       23    C PLACE EQUIPMENTLESS PERSONNEL INTO THE AVAILABLE CREW TOTALS
000109       23    C
000110       23          CREWAV(I,J)=CREWAV(I,J)+COMLOS(I,J)*CRWPER(J)-CREWLS(I,J)
000111       27    C$     WRITE(14,1040)I,RESUP(I,J,1),RESUP(I,J,2),CREWAV(I,J)
000112       23     1040 FORMAT(1X,'UNIT=',I2,' RESUP1=',F10.4,'RESUP2=',F10.4,' CREWAV=',
000113       23         1 F10.4)
000114       23    C
000115       23    C REDUCING COMBAT LOSS BY CALCULATING THE PERMANENT LOSSES DUE TO COMBAT DAMAGE
000116       23    C AND DUE TO ABANDONMENTS. IN ADDITION CALCULATE THE PERMANENT LOSSES OF
000117       23    C PERSONNEL
000118       23    C
000119       23          PRMLOS(J)=PRMLOS(J)+COMLOS(I,J)*DAMRAT(J)
000120       23          RESUP(I,J,1)=RESUP(I,J,1)+COMLOS(I,J)*DAMRAT(J)
000121       23          COMLOS(I,J)=COMLOS(I,J)-COMLOS(I,J)*DAMRAT(J)
000122       27    C$     WRITE(14,1050)I,PRMLOS(J),COMLOS(I,J)
000123       23     1050 FORMAT(1X,'UNIT=',I2,' PRMLOS=',F10.4,'COMLOS=',F10.4)
000124       23          PRMLOS(J)=PRMLOS(J)+COMLOS(I,J)*ABRAT(J)
000125       23          RESUP(I,J,1)=RESUP(I,J,1)+COMLOS(I,J)*ABRAT(J)
000126       23          COMLOS(I,J)=COMLOS(I,J)-COMLOS(I,J)*ABRAT(J)
000127       23          PERLOS(J)=PERLOS(J)+CREWLS(I,J)*CRWLSR(J)
000128       23          CREWLS(I,J)=CREWLS(I,J)-CREWLS(I,J)*CRWLSR(J)
000129       27    C$     WRITE(14,1060)PRMLOS(J),COMLOS(I,J),PERLOS(J),CREWLS(I,J)
000130       23     1060 FORMAT(1X,'PRMLOS=',F10.4,' COMLOS=',F10.4,' PERLOS=',F10.4,
000131       23         1 ' CREWLS=',F10.4)
000132       23    C
000133       23    C TOTAL THE NUMBER OF PERSONNEL TO BE ENTERED INTO HOSITAL DELAY CYCLE
000134       23    C
000135       23          HOSPER(J)=HOSPER(J)+CREWLS(I,J)
000136       23    C
000137       23    C RESUPPLY THE UNITS WITH PERSONNEL AND UPDATE RESUPPLY ON ORDER TOTALS
000138       23    C
000139       23      105 UNITOH(I,J,1)=UNITOH(I,J,1)+RESUPA(I,J,1)
000140       23          RESUPO(I,J,1)=RESUPO(I,J,1)+RESUP(I,J,1)-RESUPA(I,J,1)
000141       23          UNITOH(I,J,2)=UNITOH(I,J,2)+RESUPA(I,J,2)
000142       23          RESUPO(I,J,2)=RESUPO(I,J,2)+RESUP(I,J,2)-RESUPA(I,J,2)
000143       23          CREWAV(I,J) = CREWAV(I,J) + RESUPA(I,J,2)
000144       27    C$     WRITE(14,1070)UNITOH(I,J,1),RESUPA(I,J,1),RESUPO(I,J,1)
000145       23     1070 FORMAT(1X,'UNITOH1=',F10.4,' RESUPA1=',F10.4,' RESUP01=',F10.4)
000146       27    C$     WRITE(14,1080)UNITOH(I,J,2),RESUPA(I,J,2),RESUPO(I,J,2)
000147       23     1080 FORMAT(1X,'UNITOH2=',F10.4,' RESUPA2=',F10.4,' RESUP02=',F10.4)
000148       23          PTRANS(J)=PTRANS(J)+RESUPA(I,J,2)
000149       23    C
000150       23    C THE ARRAY, TLOS(J), CONTAINS A CUMULATIVE TOTAL OF ALL TANKS LOST
000151       23    C  DURING THIS SIMULATION.  THE "DAYLOS." OR TANKS LOST EACH DAY, ARE
000152       23    C  ADDED TO THE CUMULATIVE TOTAL EACH DAY.
000153       23    C
000154       23          TLOS(J)=TLOS(J) + DAYLOS(J)
000155       27    C$     WRITE (14,1085) I,CREWAV(I,J)
000156       23     1085 FORMAT (1X,' UNIT = ' , I2, '  CREWAV = ' , F10.4)
000157       23    C
000158       23          DAYPRM= DAYPRM + PRMLOS(J)
000159       23      110 CONTINUE
000160       23          DAYPRM = DAYPRM - PERMS
000161       23    C
000162       23    C ENTER PERSONNEL INTO THE HOSPITAL DELAY CYCLE
000163       23    C
000164       23          IF(DDAY.GT.TNOW)GO TO 130

****** UNSTAT ******
```

```
******  UNSTAT  ******

000165       23          DO 120 J=1,NTYPES
000166       23          ATRIB(1)=TNOW+DELAY
000167       23          ATRIB(2)=0.0
000168       23          ATRIB(3)=0.0
000169       23          ATRIB(4)=0.0
000170       23          ATRIB(5)=HOSPER(J)
000171       23          ATRIB(6)=0.0
000172       23          ATRIB(7)=FLOAT(J)
000173       23          CALL FILEM(1)
000174       23          HOSP(J)=HOSP(J)+HOSPER(J)
000175       23      120 CONTINUE
000176       23      130 CONTINUE
000177       27   CS     WRITE(14,1090)HOSPER(1),DAYLOS(1),TPERLS(1),TCON(1),TNCM(1)
000178       23     1090 FORMAT(1X,'HOSPER=',F10.4,' DAYLOS=',F10.4,'TPERLS=',F10.4,
000179       23         1'TCON=',F10.4,' TNCM=',F10.4)
000180       23          DO 140 J=1,NTYPES
000181       23          DO 140 I=1,NUNITS
000182       23   C
000183       23   C ZERO OUT ARRIVALS ONHAND MATRIX
000184       23   C
000185       27   CS     WRITE(14,1100) I,TOTLOS(I,J)
000186       23     1100 FORMAT(1X,' UNIT=',I3,' TOTLOS=',F10.4)
000187       23          RESUPA(I,J,1)=0.0
000188       23      140 RESUPA(I,J,2)=0.0
000189       27   CS     WRITE(14,1110) TLOS(1)
000190       23     1110 FORMAT (1X, 'TLOS = ', F10.4)
000191       27   CS     WRITE(14,2000)
000192       23     2000 FORMAT(1X,'TME END OF UNSTAT')
000193       23          RETURN
000194       23          END

******  UNSTAT  ******


******  URESUP  ******

000001       04          SUBROUTINE URESUP
000002       04          INCLUDE COMMON,LIST
000003       08   CS     WRITE (13, 1971)TNOW
000004       04     1971 FORMAT (' *****SUBROUTINE URESUP CALLED AT ',F10.1,' *****')
000005       04   C
000006       04   C THIS SUBROUTINE RECEIVES A UNIT RESUPPLIES FROM THEATER STOCKS
000007       04   C
000008       04          M=IFIX(ATRIB(3))
000009       04          N=IFIX(ATRIB(7))
000010       08   CS     WRITE (13,1979) M,N,RESUPA(M,N,1),RESUPA(M,N,2)
000011       04          RESUPA(M,N,1)=RESUPA(M,N,1)+ATRIB(4)
000012       05          TRANST(N)=TRANST(N)-ATRIB(4)
000013       04          RESUPA(M,N,2)=RESUPA(M,N,2)+ATRIB(5)
000014       08   CS     WRITE (13,1979) RESUPA(M,N,1), ATRIB(4), RESUPA(M,N,2), ATRIB(5)
000015       04          RETURN
000016       04          END

******  URESUP  ******
```

```
****** WARES ******

000001       09         SUBROUTINE WARES
000002       09         INCLUDE COMMON,LIST
000003       13   C$     WRITE (13, 1971)TNOW
000004       09    1971 FORMAT (' ****SUBROUTINE WARES CALLED AT ',F10.1,' *****')
000005       09   C
000006       09   C THIS SUBROUTINE HANDLES THE WAR RESERVES PORTION OF THE DAILY EVENTS CYCLE
000007       09   C INITIALLY, THE WAR RESERVE OUTPUTS ARE DETERMINED. AFTERWARD, NEWLY ARRIVED
000008       09   C SUPPLIES ARE ADDED TO RESERVE STOCKS
000009       09   C
000010       09         DO 100 I=1,NTYPES
000011       13   C$     WRITE (13,1000) PWRS(I)
000012       09    1000 FORMAT (1X, 'INITIAL PWRS= ' , F10.4)
000013       09   C
000014       09   C DETERMINE WARE RESERVES OUTPUT AND ADJUST PWRS STOCK
000015       09   C
000016       09         WRSRT=PWRSRT(I)
000017       09         IF (I.EQ.1) WRSRT=WRSRT+6SS + 8S
000018       09         PWRSOU(I)=WRSRT/PWRSHR(I)
000019       09   C
000020       09   C IF REMAIN PWRS STOCKS LESS THAN OUTPUT RATE THEN OUTPUT REMAINING STOCKS
000021       09   C
000022       09         IF(PWRS(I).LT.PWRSOU(I)) PWRSOU(I)=PWRS(I)
000023       11         PWRS(I)=PWRS(I)-PWRSOU(I)
000024       13   C$     WRITE (13,1010) PWRSOU(I)
000025       11      100 CONTINUE
000026       09    1010 FORMAT (1X, 'PWRSOU= ' , F10.4)
000027       09         DO 150 I=1,NTYPES
000028       09   C
000029       09   C INCREASE WAR RESERVES BY NEWLY ARRIVED SUPPLIES
000030       09   C
000031       09         PWRS(I)=PWRS(I)+PWRSIN(I)
000032       13   C$     WRITE (13,1020) PWRS(I),PWRSIN(I)
000033       09    1020 FORMAT (1X, 'PWRS ', F10.4, 'PWRSIN = ', F10.4)
000034       10         SUPTOT(I)=SUPTOT(I)+PWRSIN(I)
000035       09         PWRSIN(I)=0.0
000036       09      150 CONTINUE
000037       09         RETURN
000038       09         END

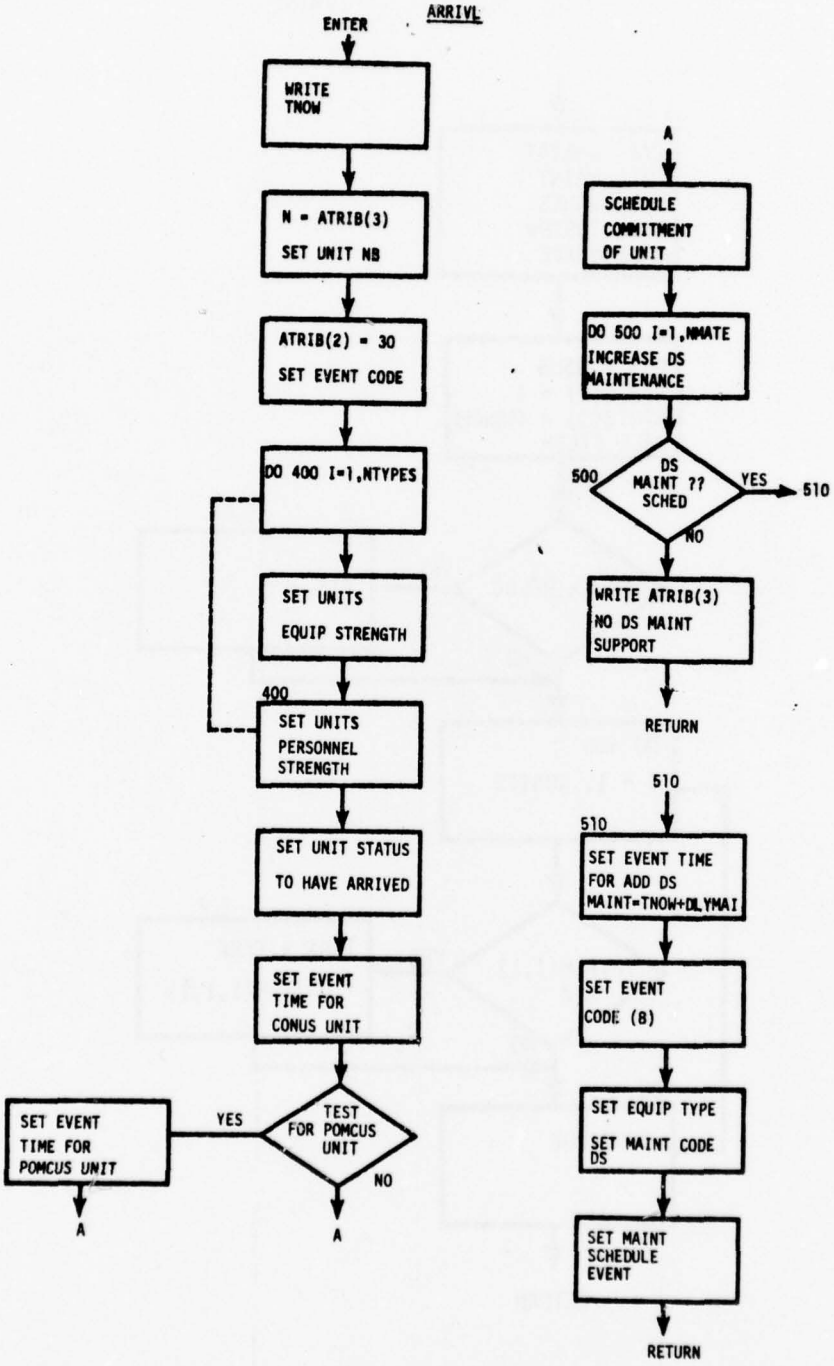
****** WARES ******
```

```
****** WRARR ******

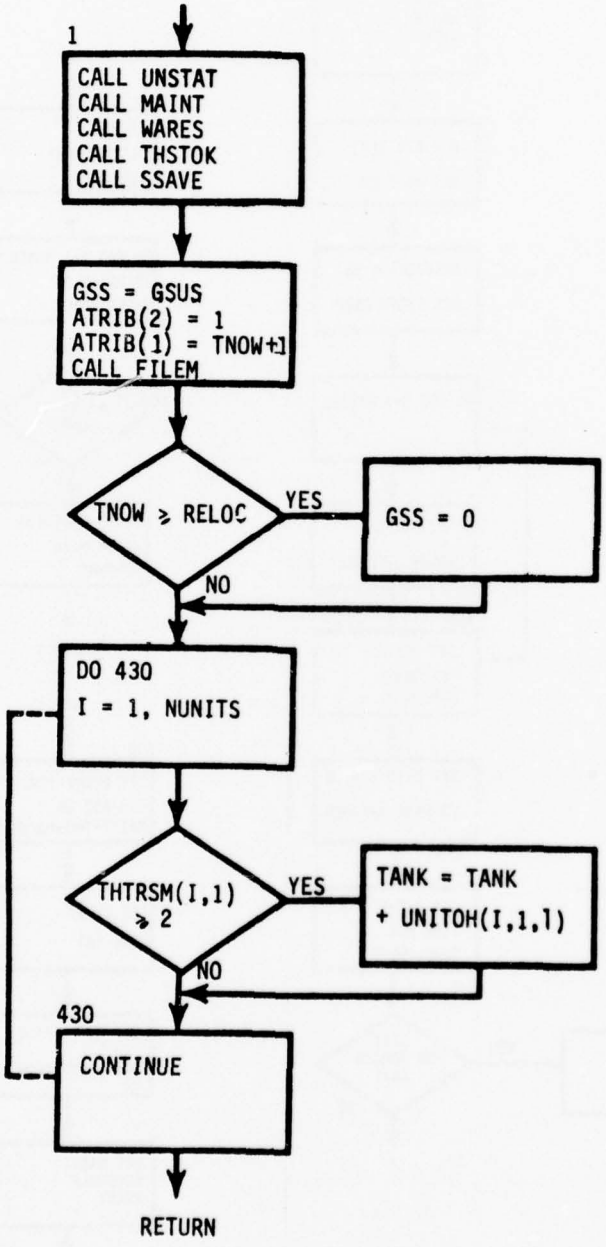
000001       00         SUBROUTINE WRARR
000002       00         INCLUDE COMMON,LIST
000003       01   C$     WRITE (13, 1971)TNOW
000004       00    1971 FORMAT (' *****SUBROUTINE WRARR CALLED AT ',F10.1,' *****')
000005       00   C
000006       00   C THIS SUBROUTINE RECEIVES WAR RESERVE RESUPPLIES FROM CONUS
000007       00   C
000008       00         N=IFIX(ATRIB(7))
000009       00         PWRSIN(N)=PWRSIN(N)+ATRIB(4)
000010       00         RETURN
000011       00         END

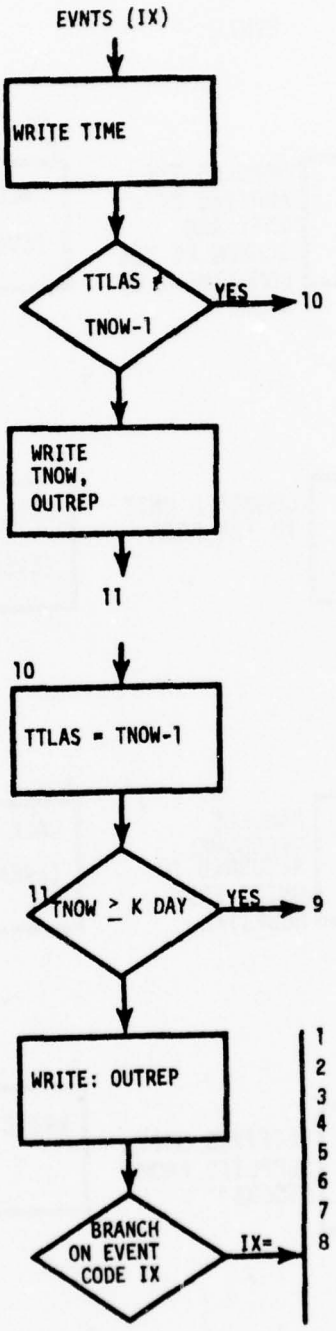
****** WRARR ******
```

Section II. FLOW DIAGRAMS

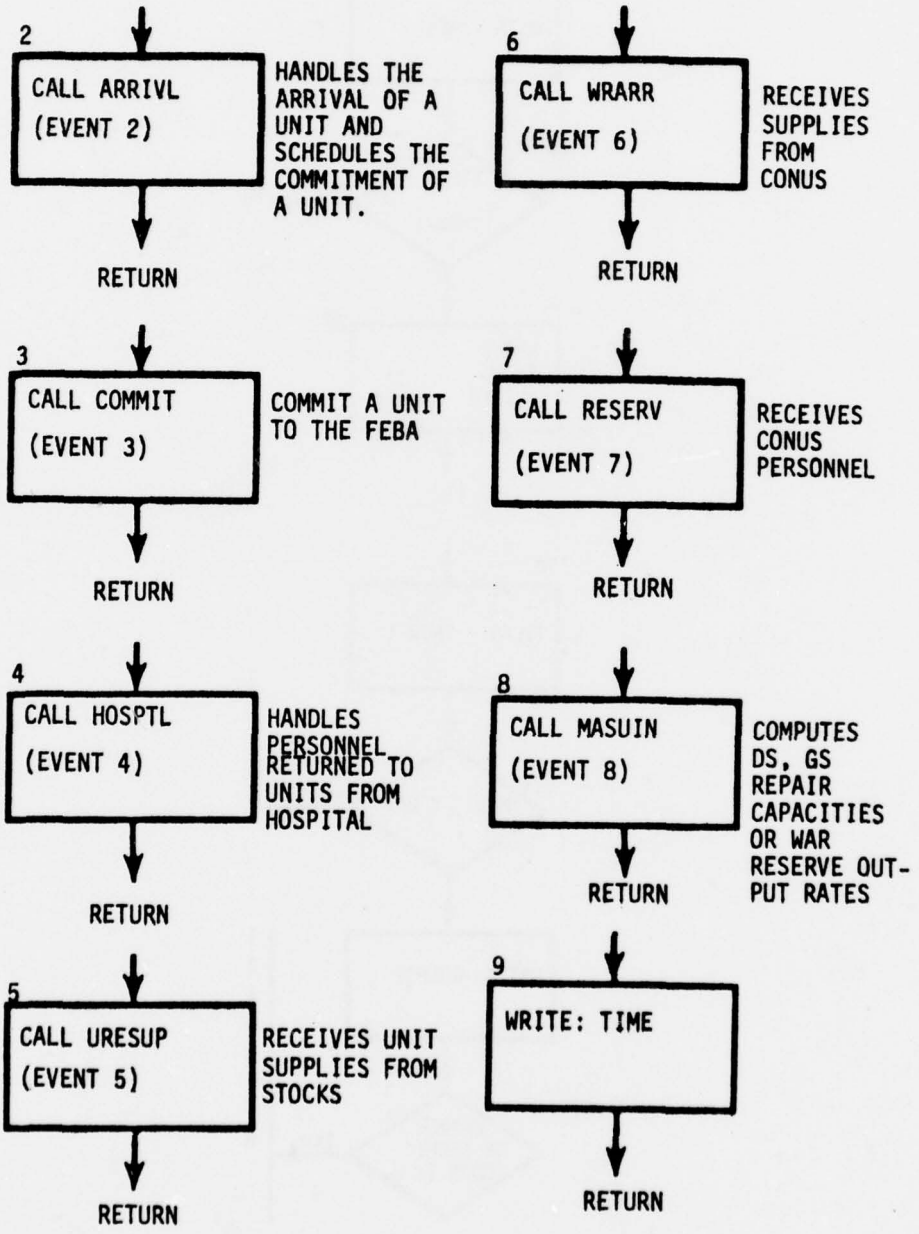


EVNTS

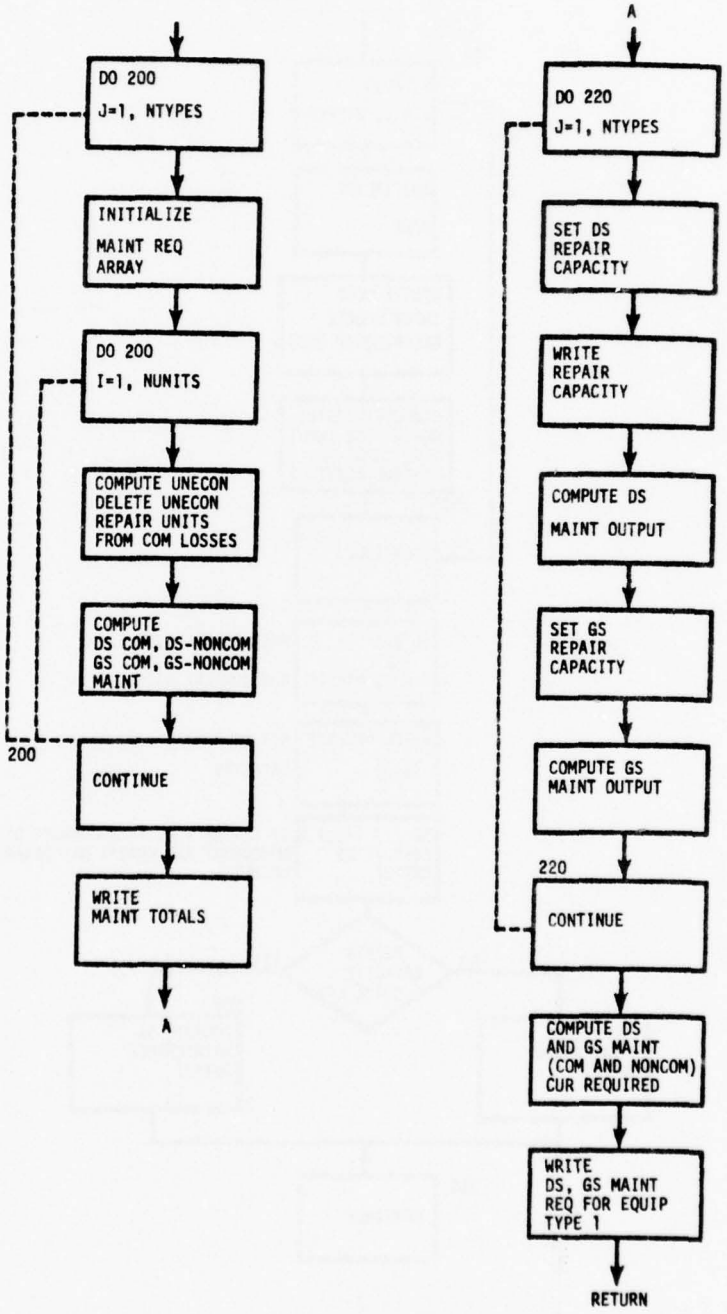

1
CALL UNSTAT
CALL MAINT
CALL WARES
CALL THSTOK
CALL SSAVE
GSS = GSUS
ATRIB(2) = 1
ATRIB(1) = TNOW+1
CALL FILEM
TNOW ≥ RELOC
YES
GSS = 0
NO
DO 430
I = 1, NUNITS
THTRSM(I,1) ≥ 2
YES
TANK = TANK + UNITOH(I,1,1)
NO
430
CONTINUE
RETURN

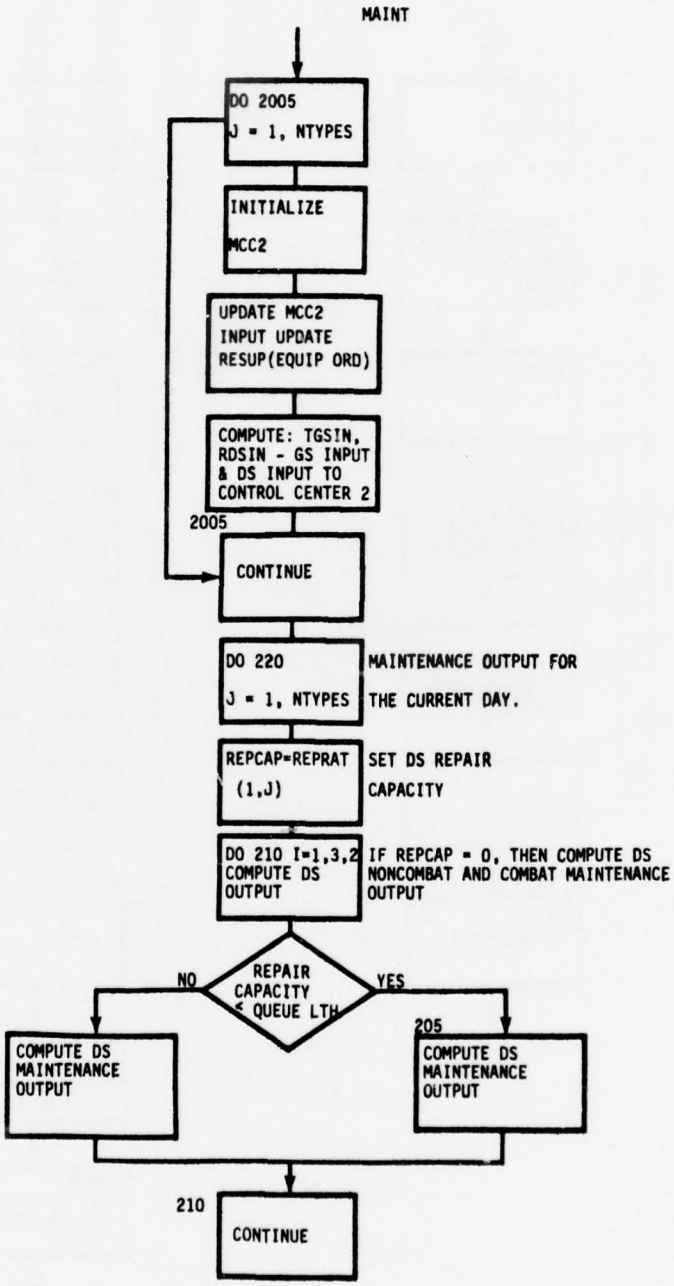

EVNTS (IX)
WRITE TIME
TTLAS =
TNOW-1
YES
10
WRITE
TNOW,
OUTREP
11
10
TTLAS = TNOW-1
11
TNOW ≥ K DAY
YES
9
WRITE: OUTREP
BRANCH
ON EVENT
CODE IX
IX=
1
2
3
4
5
6
7
8

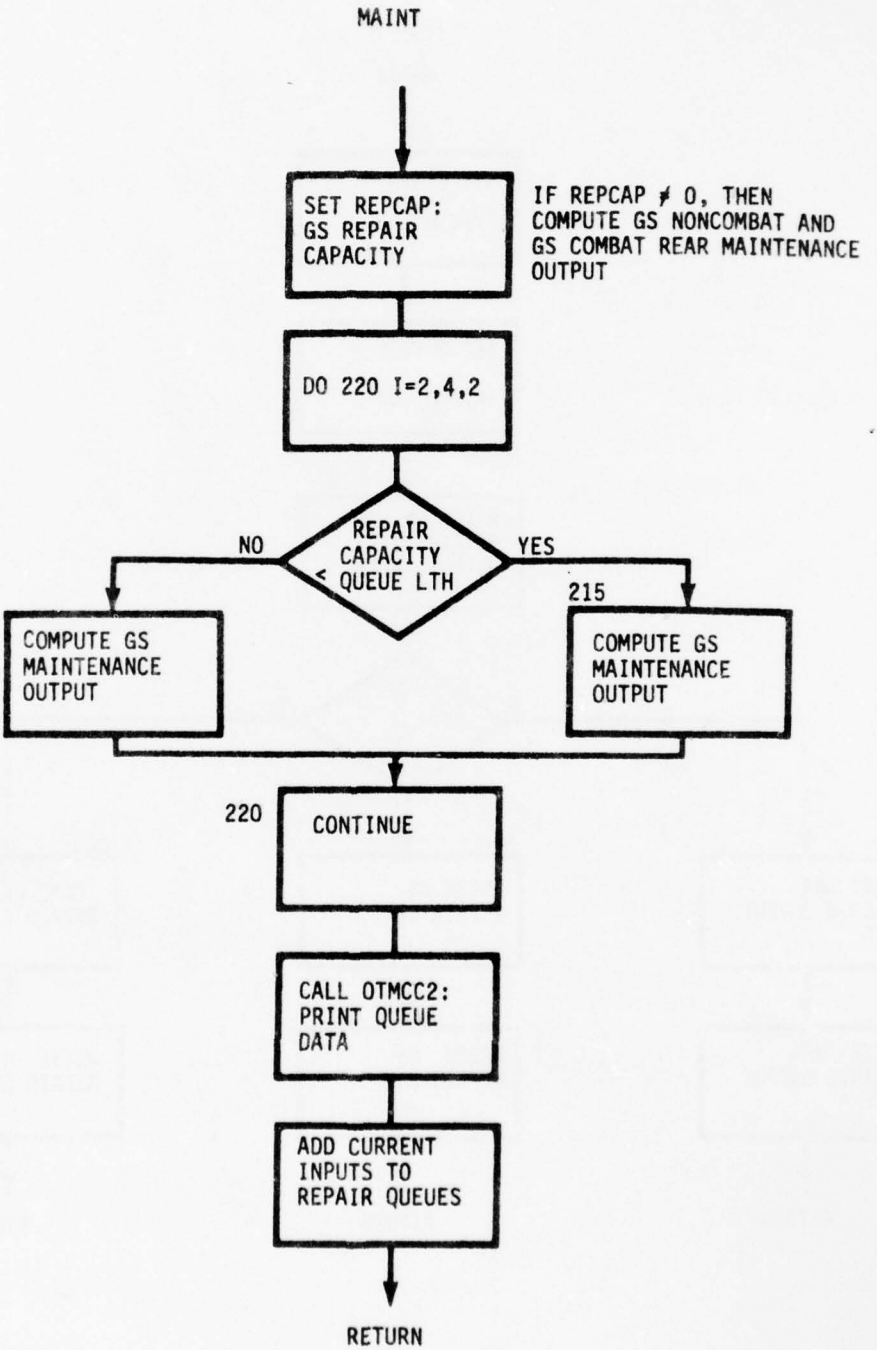
EVNTS

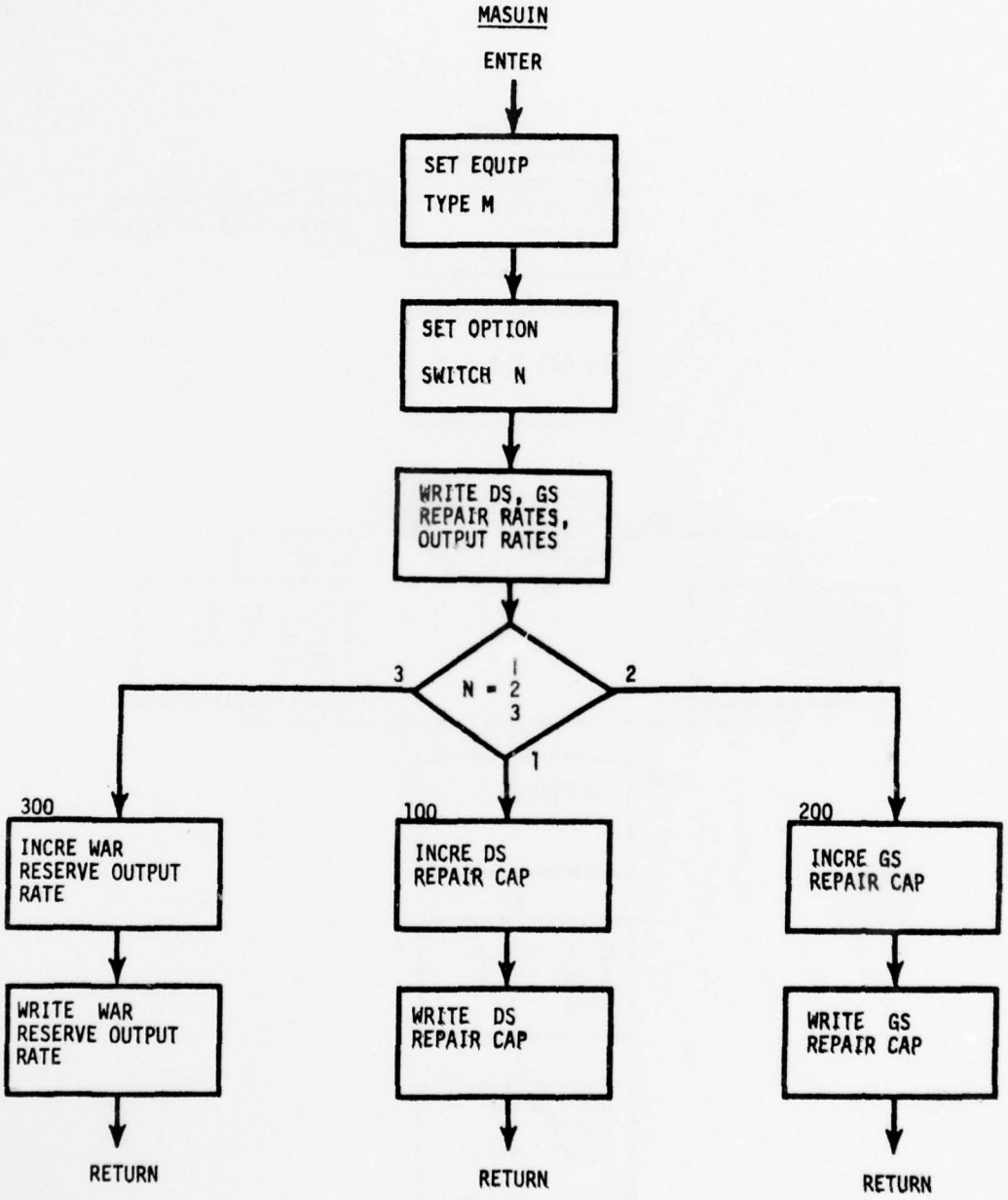

2
CALL ARRIVL
(EVENT 2)
HANDLES THE ARRIVAL OF A UNIT AND SCHEDULES THE COMMITMENT OF A UNIT.
RETURN
3
CALL COMMIT
(EVENT 3)
COMMIT A UNIT TO THE FEBA
RETURN
4
CALL HOSPTL
(EVENT 4)
HANDLES PERSONNEL RETURNED TO UNITS FROM HOSPITAL
RETURN
5
CALL URESUP
(EVENT 5)
RECEIVES UNIT SUPPLIES FROM STOCKS
RETURN
6
CALL WRARR
(EVENT 6)
RECEIVES SUPPLIES FROM CONUS
RETURN
7
CALL RESERV
(EVENT 7)
RECEIVES CONUS PERSONNEL
RETURN
8
CALL MASUIN
(EVENT 8)
COMPUTES DS, GS REPAIR CAPACITIES OR WAR RESERVE OUTPUT RATES
RETURN
9
WRITE: TIME
RETURN

MAINT

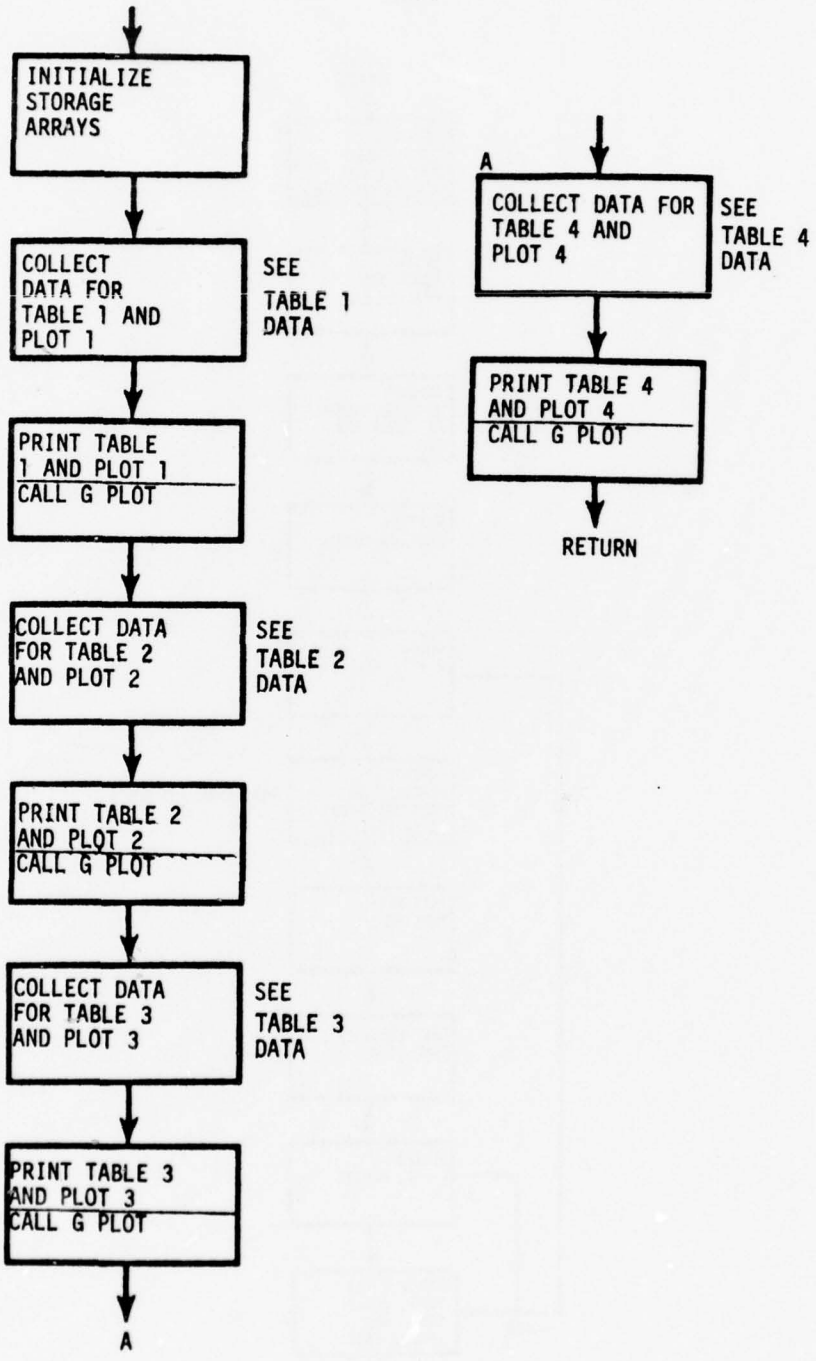

DO 200
J=1, NTYPES
INITIALIZE
MAINT REQ
ARRAY
DO 200
I=1, NUNITS
COMPUTE UNECON
DELETE UNECON
REPAIR UNITS
FROM COM LOSSES
COMPUTE
DS COM, DS-NONCOM
GS COM, GS-NONCOM
MAINT
200
CONTINUE
WRITE
MAINT TOTALS
A
A
DO 220
J=1, NTYPES
SET DS
REPAIR
CAPACITY
WRITE
REPAIR
CAPACITY
COMPUTE DS
MAINT OUTPUT
SET GS
REPAIR
CAPACITY
COMPUTE GS
MAINT OUTPUT
220
CONTINUE
COMPUTE DS
AND GS MAINT
(COM AND NONCOM)
CUR REQUIRED
WRITE
DS, GS MAINT
REQ FOR EQUIP
TYPE 1
RETURN

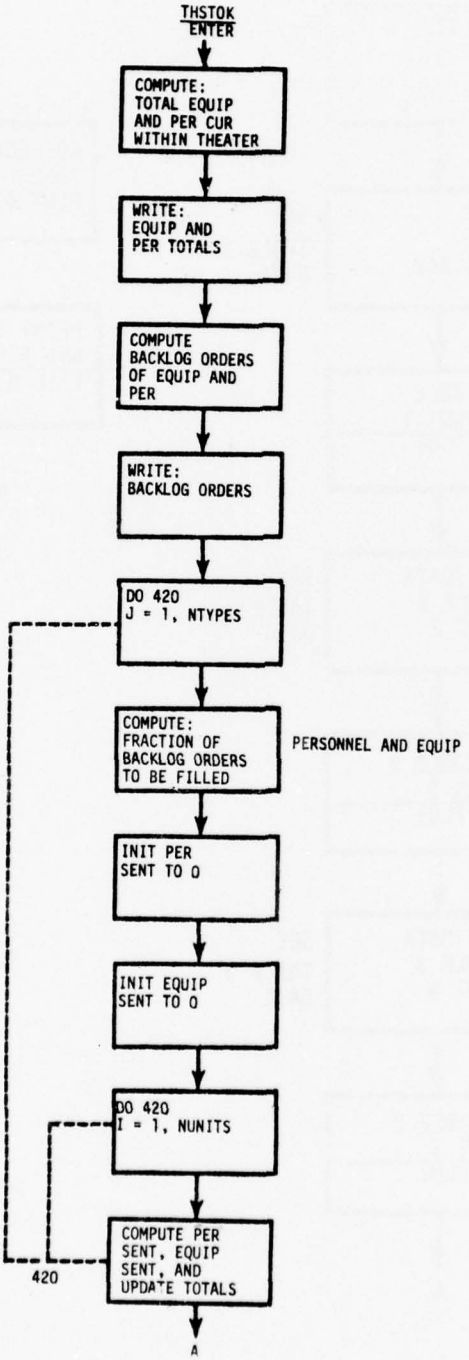

MAINT
DO 2005
J = 1, NTYPES
INITIALIZE
MCC2
UPDATE MCC2
INPUT UPDATE
RESUP(EQUIP ORD)
COMPUTE: TGSIN,
RDSIN - GS INPUT
& DS INPUT TO
CONTROL CENTER 2
2005
CONTINUE
DO 220
J = 1, NTYPES
MAINTENANCE OUTPUT FOR
THE CURRENT DAY.
REPCAP=REPRAT
(1,J)
SET DS REPAIR
CAPACITY
DO 210 I=1,3,2
COMPUTE DS
OUTPUT
IF REPCAP = 0, THEN COMPUTE DS
NONCOMBAT AND COMBAT MAINTENANCE
OUTPUT
REPAIR
CAPACITY
< QUEUE LTH
NO
YES
COMPUTE DS
MAINTENANCE
OUTPUT
205
COMPUTE DS
MAINTENANCE
OUTPUT
210
CONTINUE

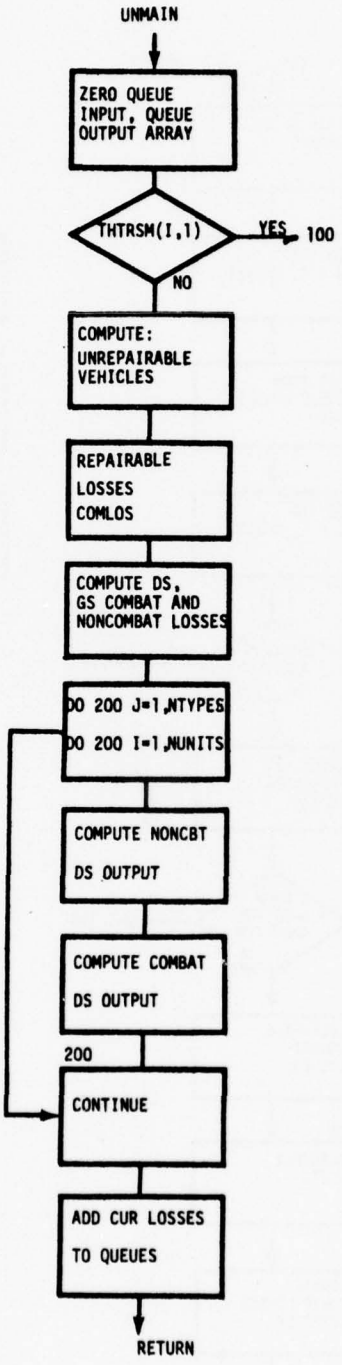

MAINT
SET REPCAP: GS REPAIR CAPACITY
IF REPCAP ≠ 0, THEN COMPUTE GS NONCOMBAT AND GS COMBAT REAR MAINTENANCE OUTPUT
DO 220 I=2,4,2
REPAIR CAPACITY < QUEUE LTH
NO
YES
215
COMPUTE GS MAINTENANCE OUTPUT
COMPUTE GS MAINTENANCE OUTPUT
220
CONTINUE
CALL OTMCC2: PRINT QUEUE DATA
ADD CURRENT INPUTS TO REPAIR QUEUES
RETURN

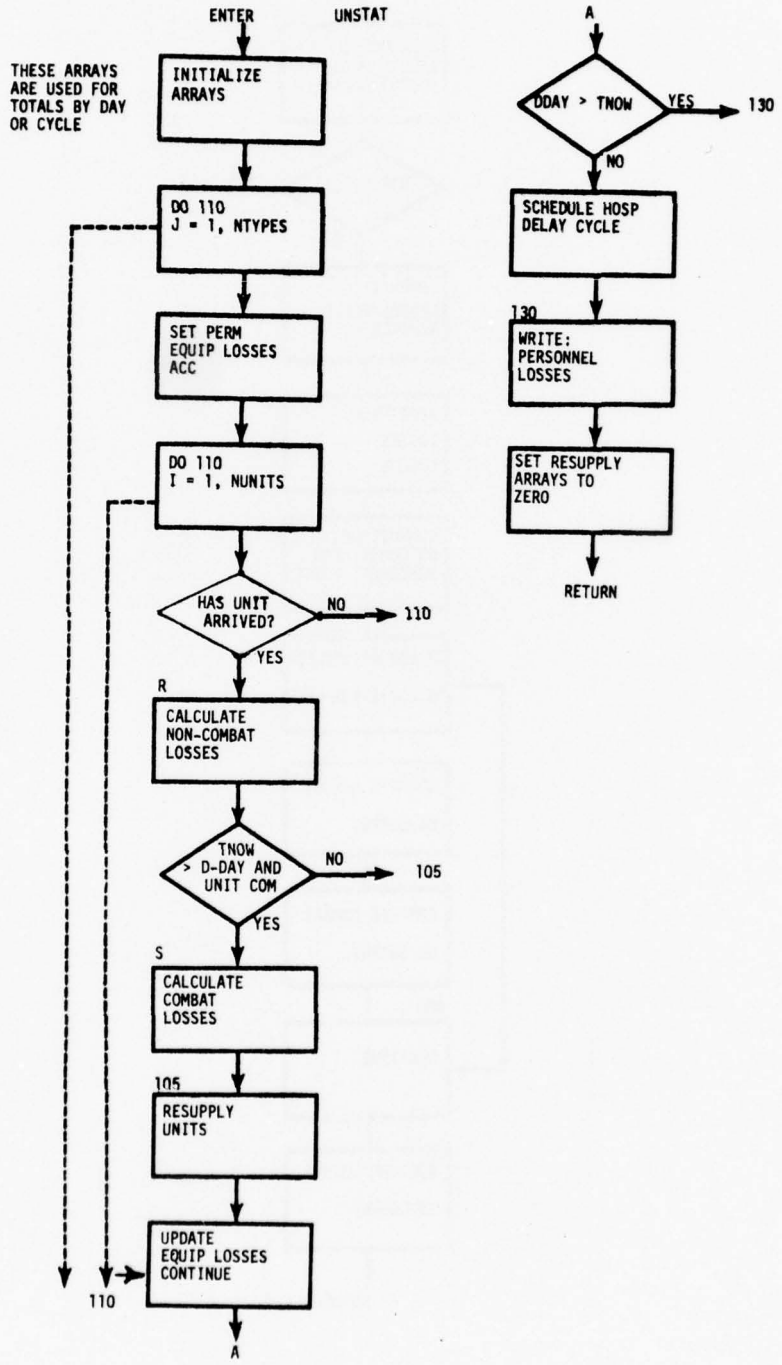

MASUIN
ENTER
SET EQUIP
TYPE M
SET OPTION
SWITCH N
WRITE DS, GS
REPAIR RATES,
OUTPUT RATES
N = 1 2 3
3
2
1
300
INCRE WAR
RESERVE OUTPUT
RATE
WRITE WAR
RESERVE OUTPUT
RATE
RETURN
100
INCRE DS
REPAIR CAP
WRITE DS
REPAIR CAP
RETURN
200
INCRE GS
REPAIR CAP
WRITE GS
REPAIR CAP
RETURN

SSAVE

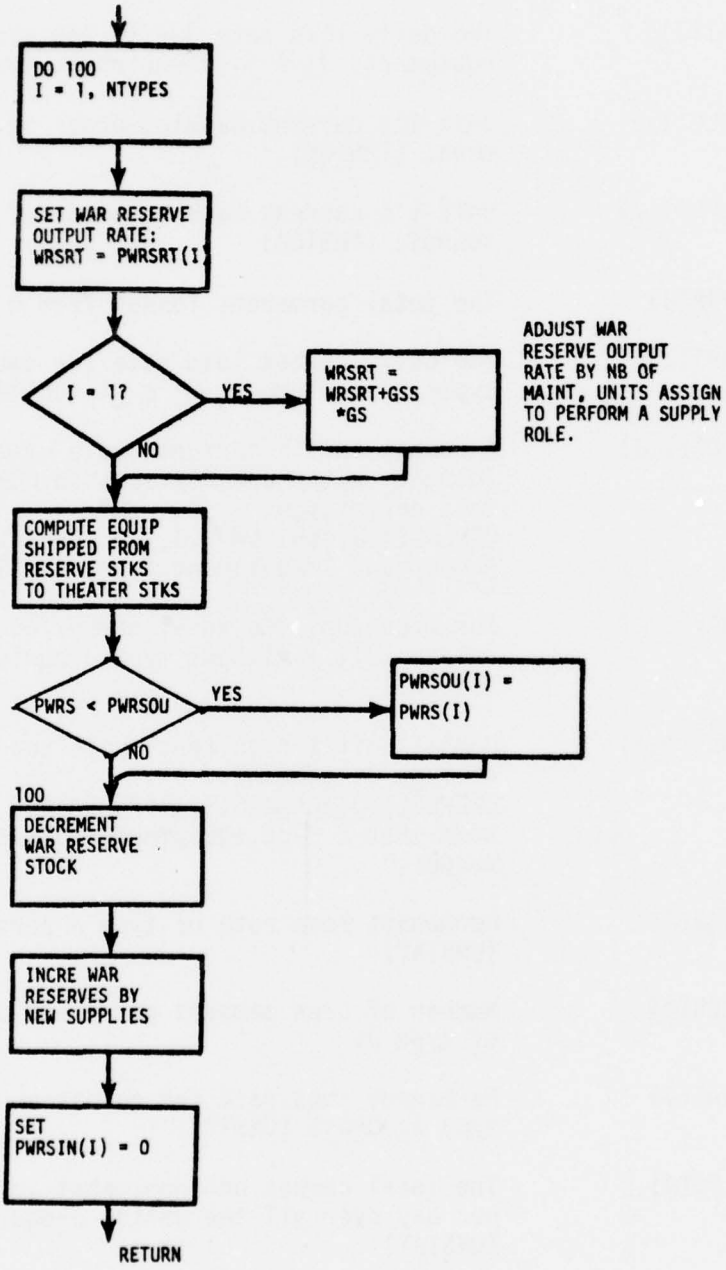

INITIALIZE STORAGE ARRAYS
COLLECT DATA FOR TABLE 1 AND PLOT 1
SEE TABLE 1 DATA
PRINT TABLE 1 AND PLOT 1
CALL G PLOT
COLLECT DATA FOR TABLE 2 AND PLOT 2
SEE TABLE 2 DATA
PRINT TABLE 2 AND PLOT 2
CALL G PLOT
COLLECT DATA FOR TABLE 3 AND PLOT 3
SEE TABLE 3 DATA
PRINT TABLE 3 AND PLOT 3
CALL G PLOT
A
A
COLLECT DATA FOR TABLE 4 AND PLOT 4
SEE TABLE 4 DATA
PRINT TABLE 4 AND PLOT 4
CALL G PLOT
RETURN


THSTOK
ENTER
COMPUTE:
TOTAL EQUIP
AND PER CUR
WITHIN THEATER
WRITE:
EQUIP AND
PER TOTALS
COMPUTE
BACKLOG ORDERS
OF EQUIP AND
PER
WRITE:
BACKLOG ORDERS
DO 420
J = 1, NTYPES
COMPUTE:
FRACTION OF
BACKLOG ORDERS
TO BE FILLED
PERSONNEL AND EQUIP
INIT PER
SENT TO 0
INIT EQUIP
SENT TO 0
DO 420
I = 1, NUNITS
COMPUTE PER
SENT, EQUIP
SENT, AND
UPDATE TOTALS
420
A


UNMAIN
ZERO QUEUE INPUT, QUEUE OUTPUT ARRAY
THTRSM(I,1)
YES
100
NO
COMPUTE: UNREPAIRABLE VEHICLES
REPAIRABLE LOSSES COMLOS
COMPUTE DS, GS COMBAT AND NONCOMBAT LOSSES
DO 200 J=1,NTYPES
DO 200 I=1,NUNITS
COMPUTE NONCBT DS OUTPUT
COMPUTE COMBAT DS OUTPUT
200
CONTINUE
ADD CUR LOSSES TO QUEUES
RETURN


ENTER
UNSTAT
THESE ARRAYS ARE USED FOR TOTALS BY DAY OR CYCLE
INITIALIZE ARRAYS
DO 110 J = 1, NTYPES
SET PERM EQUIP LOSSES ACC
DO 110 I = 1, NUNITS
HAS UNIT ARRIVED?
NO
110
YES
R
CALCULATE NON-COMBAT LOSSES
TNOW > D-DAY AND UNIT COM
NO
105
YES
S
CALCULATE COMBAT LOSSES
105
RESUPPLY UNITS
UPDATE EQUIP LOSSES CONTINUE
110
A
A
DDAY > TNOW
YES
130
NO
SCHEDULE HOSP DELAY CYCLE
130
WRITE: PERSONNEL LOSSES
SET RESUPPLY ARRAYS TO ZERO
RETURN

WARES


DO 100
I = 1, NTYPES
SET WAR RESERVE OUTPUT RATE:
WRSRT = PWRSRT(I)
I = 1?
YES
NO
WRSRT = WRSRT+GSS *GS
ADJUST WAR RESERVE OUTPUT RATE BY NB OF MAINT, UNITS ASSIGN TO PERFORM A SUPPLY ROLE.
COMPUTE EQUIP SHIPPED FROM RESERVE STKS TO THEATER STKS
PWRS < PWRSOU
YES
NO
PWRSOU(I) = PWRS(I)
100
DECREMENT WAR RESERVE STOCK
INCRE WAR RESERVES BY NEW SUPPLIES
SET PWRSIN(I) = 0
RETURN

Section III. COMMON/ARRAY 1

ABRAT(J)	The daily loss rate due to the abandonment of equipment, $0 \leq A \leq$. J=equipment type. (UNSTAT)
BACKLG(I,J)	Unit I's current backlog order of type J equipment. (THSTOK)
BACKPL(I,J)	Unit I's current backlog order of type J personnel. (THSTOK)
BUFPRM(J)	The total permanent losses from 0 to (TNOW-1).
COMRAT(J)	The daily combat loss rate for each of the J types of equipment. $0 \leq c \leq 1$ (UNSTAT)
COMLOS(I,J)	A combat unit's current cycle combat equipment losses. Later computations on COMLOS alter this definition. COMLOS(I,J)=UNITOH(I,J,1)* COMRAT(J) I=unit number and J=equipment type. (UNSTAT, MAINT)
CREWAV(I,J)	For each run, the total number of crew personnel in unit I without type J equipment. (UNSTAT)
CREWLS(I,J)	Combat unit I's current cycle personnel losses of type J. (UNSTAT) CREWLS(I,J)=COMLOS(I,J)*PERRAT(J) Note that J type equipment implies J type personnel.
CRWLSR(J)	Permanent loss rate of type J personnel. $0 \leq C \leq 1$ (UNSTAT)
CRWPER(J)	Number of crew members per piece of equipment of type J.
DAMRAT(J)	Permanent loss rate for combat equipment of type J. $0 \leq D \leq 1$ (UNSTAT)
DAYLOS(J)	The total combat and noncombat losses summed per day over all the units, J=equipment type. (UNSTAT)

DSCOM(J)	The fraction of repairable combat losses which requires direct support maintenance. J=equipment type. $0 \leq D \leq 1$ (MAINT)
DSNCM(J)	The fraction of repairable noncombat losses which requires direct support maintenance. J=equipment. $0 \leq D \geq 1$ (MAINT)
DSREPB(J)	DS maintenance (combat and noncombat) needed for equipment awaiting repair J=equipment type. (MAINT)
DSC (I,J)	(L-9 DCS(I,J)=R_c(I,J)-GSC(I,J), where R_c(I,J) is the repairable combat losses)
DSN(I,J)	(L-9 DSN(I,J)=R_n(I,J)-GSN(,J), where R_n(I,J) is the repairable noncombat losses)
GSCOM(J)	The fraction of repairable combat losses which require general support maintenance. J=equipment type $0 < G < 1$.(MAINT) GSCOM(I)=1.0-DSCOM(I)
PSNCM(J)	The fraction of repairable noncombat losses which require general support maintenance. J=equipment type $0 \leq G \leq 1$ GS NCM(I)=1 -DSNCM(I)
GSREPB(J)	GS maintenance (combat and noncombat) needed for equipment awaiting repair. J=equipment type. (MAINT)
GSC(I,J)	(L-9 GSC(I,J)=GSCOM(J)* R_c(I,J), where R_c is the repairable combat losses.
(L-9 GSN(I,J)	(L-9 GSN(I,J)=GSNCM(J)*R_n(I,J), where R_n is the repairable noncombat losses.
HOSPER(J)	The number of personnel of type J to enter the hospital delay route on the current cycle. (UNSTAT)
HOSPING(J)	Number of personnel of type J arriving in the theater personnel pool from the hospital on this cycle. (HOSPTL)

MACAPI(I,J)

(I,1)	An index number used to associate maintenance capacity with a given unit.
(I,2)	Total maintenance capacity of a unit.
(I,J≥3)	The fraction of the unit's total maintenance capacity which is devoted to DS maintenance, [0,1] for this type of equipment

MAFACT(1,J)	average DS noncombat loss maintenance required.
(2,J)	average GS noncombat loss maintenance required.
(3,J)	average DS combat loss maintenance required.
(4,J)	average GS combat loss maintenance required.

Units are manhours/vehicle J=equipment type

MCC1	(K,J,1,1)	-	queue length, noncombat
	(I,J,1,2)	-	queue length, combat
	(I,J,2,1)	-	queue output, noncombat
	(I,J,2,2)	-	queue output, combat
	(I,J,3,1)	-	queue input, noncombat
	(I,J,3,2)	-	queue input, combat

Maintenance control center number 1 indicating for each unit I, by equipment type J, the DS maintenance input and output by the unit (numbers of vehicles).

input waiting repairs output

MCC1(I,J,3,L)=MCC1(I,J,1,L)+MCC1(I,J,2,L)

MC1(I,J,K,L)

I	J	K	L
Unit nb	Equip type	1 queue length	1 noncombat
		2 queue output	2 combat
		3 queue input	

MCC2(L,K,J) Maintenance control center number 2. The DS and GS maintenance output by rear maintenance units (numbers of vehicles).

L			K	J
1	DS	noncombat	1 queue length	equipment
2	GS	noncombat	2 queue length	type
3	DS	combat	3 queue output	
4	GS	combat		

input waiting repairs output

MCC2(L,2,J)=MCC2 (L,1,J)+MCC2(L,3,J)

Note that the subscript for queue input and output is reversed for MCC1 and MCC2.

NCMLOS(I,J)	A unit's noncombat losses for a specific type of equipment.
NCMRAT(J)	The noncombat loss rates (a percentage) for a specific type of equipment J=type of equipment. (UNSTAT)

COMMON/ARRAY 2/

PERFAC(J)	The fraction of backlogged personnel orders which will be filled on this cycle, $0 \leq P \leq 1$ J= personnel type. (THSTOK)
PERLOS(J)	The total number of personnel of type J permanently lost in a run. (UNSTAT)
PERRAT(J)	The combat personnel loss rate for type equipment. (UNSTAT) Personnel loss rate = number of people lost / combat loss
PERSEN(K,J)	The number of personnel, of type J, sent to unit I on the current cycle. (THSTOK)
PERSIN(J)	The number of personnel, of type J, arriving from CONUS on this cycle. (RESERV)
PRMLOS(J)	The cumulative number of permanent losses of equipment of type, J, from 0 to TNOW. (UNSTAT)
PRS(J)	The quantity of equipment, of type J, currently in war reserve stocks. (WARES)
PWRSHR(J)	The number of manhours of work required to output a piece of equipment of type J. (WARES)
PWRSIN(J)	The number of combat vehicles of type J, which have entered war reserve stocks on the current cycle. (WARES)
PWRSOU(J)	The number of combat vehicles, of type J, which have been shipped from war reserve stocks to theater stocks on the current cycle. (WARES) (THSTOK)
PWRSRT(J)	The war reserve output rate for each type of equipment. The output rate is specified in manhours/day. (WARES)
REPAIR (1,J)	The expected DS noncombat maintenance for the current cycle, equipment type J.

REPAIR (2,J)	The expected GS noncombat maintenance for the current cycle, equipment type J.
REPAIR (3,J)	The expected DS combat maintenance for the current cycle, equipment type J.
REPAIR(4,J)	The expected GS combat maintenance for the current cycle, equipment type J. (MAINT) Units are manhours of work.
REPIN(1,J)	The total DS noncombat maintenance required, for equipment of type J, for the vehicles awaiting repair.
REPIN(2,J)	The total GS noncombat maintenance required, for equipment of type J, for the vehicles awaiting repair.
REPIN(3,J)	The total DS combat maintenance required, for equipment of type J, for the vehicles awaiting repair.
REPIN(4,J)	The total GS combat maintenance required, for equipment of type J, for the vehicles awaiting repair. (MAINT) Units are manhours of work.
REPOUT(J)	The number of vehicles, of type J, repaired by maintenance in this cycle. (MAINT)
REPRAT(1,J)	The DS repair capacity of each type of equipment.
REPRAT(2,J)	The GS repair capacity for each type of equipment. (MAINT) Units are manhours of work/day
RESUP(I,J,K)	The quantity of equipment or personnel, by type and unit ordered on the current cycle; I=unit number; J=equipment type for K=1, and J=personnel type for K=2. (UNSTAT)

RESUPA(I,J,K)	The quantity of equipment or personnel, by type, arriving in unit I on the current cycle. K=1 implies equipment, K=2 implies personnel, (UNSTAT)
RESUPO(I,J,K)	The total quantity of equipment or personnel, by type currently on order by unit I. K=1 implies equipment, K=2 implies personnel. (UNSTAT)
SUPFAC(J)	The fraction of backlogged equipment orders of types J, which will be filled on the current cycle. (THSTOK)
SUPSEN(I,J)	The quantity of equipment, of type J, sent to unit I on the current cycle. (THSTOK)
TCKLG(J)	The total backlog orders of type J equipment. (THSTOK)
TCKPL(J)	The total backlog orders of type J personnel. (THSTOK)
TCOM(J)	The total combat equipment losses, by type, for the current cycle. (THSTOK)
THTRSM(I,K)	Unit status matrix.
THTRSM(I,1)	I=0 Unit I has not arrived I=1 Unit I has arrived I=2 Unit I is committed
THTRSM(I,2)	I=1 Unit I, on station unit I=2 Unit I, POMCUS unit I=3 Unit I, CONUS unit
THTRSM(I,3)	An index number for unit I. The index number is used to perform a table look-up in the array MACAPT to obtain maintenance capacity.
THTRSM(I,4)	Arrival time of the unit.
TLOS(J)	The total combat and noncombat equipment losses, by type, for a run. (UNSTAT)

TNCM(J)	The total noncombat equipment losses, by type, for the current cycle. (USNTAT)
TOTLOS(I,J)	The total combat and noncombat equipment losses for the current cycle, unit I, and equipment type J. (UNSTAT)
TOTPER(J)	The total supply of type J personnel currently available within theater personnel pools. (THSTOK)
TOTSTK(J)	The quantity of equipment, of type J, currently available within theater stock. (THSTOK)
TPERLS(J)	The total personnel losses, by type, for the current cycle. (UNSTAT)
TPERS(I,J)	The quantity of personnel, of type J, currently in theater stocks. I=1, implies replacement personnel; I=2, implies hospital returned personnel. (THSTOK)
TPRSEN(J)	The total number of personnel of type J, sent to all the units on the current cycle. (THSTOK)
TSPNOT(J)	The quantity of equipment, of type J, not sent to units due to a lack of personnel, current cycle. (THSTOK)
TSPSEN(J)	The quantity of equipment, of type J, sent on the current cycle. (THSTOK)
TSTOCK(I,J)	The quantity of equipment, of type J, currently in theater stocks. I=1, implies war reserves; I=2, implies repaired equipment. (THSTOK)
TRANST(J)	The quantity of equipment, of type J, in transit from theater stocks to units (THSTOSK).
UNECON(J)	The total uneconomically repairable combat equipment, of type J, in a run. (MAINT)
UNECRT(J)	The uneconomically repairable rate for equipment type J. (See equations) (MAINT) [0,1].

UNITAU(I,J,K)	The authorized equipment level and personnel level for unit I. K=1, implies J=equipment type; K=2, implies J=personnel type.
UNITOH(I,J,K)	The onhand equipment level and personnel level for unit I. K=1, implies J=equipment type; K=2, personnel type. (UNSTAT)
UNREP(J)	The unrepairable rate for noncombat damaged equipment of type J. [0,1], (UNSTAT)
UNTMAC(I,J)	DS unit repair capacity by equipment type. (manhours of work/day).

COMMON/CHECK/

HOSP(J)	The number of personnel entered into the hospital delay cycle. (UNSTAT) HOSP(J)=HOSP(J)+HOSPER(J)
OTGS(J)	Cummulative GS maintenance output from control center two. (MAINT) OTGS(J)=OTGS(J)+MCC2(I,3,J), where I equals 2 or 4 and J is equipment type.
OTRDS(J)	Cummulative DS maintenance output from control center two. (MAINT) OTRDS(J)=OTRDS(J)+MCC2(I,3,J). where I equals 1 or 3 and J is equipment type.
OTUNDS(J)	Cummulative DS maintenance output from control center one. (UNMAIN) OTUNDS(J)=OTUNDS(J)+MCC1(I,J,2,K), where K=1 or 2 and I and J indicates unit and equipment type respectively.
PERARR(J)	The number of arrived replacement personnel. (THSTOK) PERARR(J)+PERARR(J)+PERSIN(J)
PTRANS(J)	The personnel in transit. (THSTOK) and (UNSTAT) PTRANS(J)=PTRANS(J)+TPRSEN(J) PTRANS (J)=PTRANS(J)-RESUPA(I,J,2) Personnel in transit from theater stocks to units.

RSIN(J)	Total DS input to control center two. (MAINT) RDSIN(J)=RDSIN(J)+MCC2(1,2J)+MCC2(3,2,J)
SUPTOT(J)	The number of combat vehicles which have been added to war reserve stocks for all cycles. (WARES) (WRARR). SUPTOT(I)=SUPTOT(I)+PWRSIN(I)
TGSIN(J)	Total GS input to control center two. (MAINT) TSIN(J)=TGSIN(J)+MCC2(2,2,J)+MCC2(4,2,J)
UNDSIN(J)	Cummulative DS maintenance input to control center one. (UNMAIN) UNDSIN(J)=UNDSIN(J)+MCC1(I,J,3,1)+MCC1(I,J,3,2)
WARRES(J)	The initial war reserve stocks. (INTLC) WARRES(J)=PWRS(J).

IN(11,D,T)-Summary Report Array.

IN(1,IDAY,J)=IN(1,IDAY,J)+UNITAU(I,J,1)

IN(2,IDAY,J)=SUPTOT(J)

IN(3,IDAY,J)=WARRES(J)

IN(4,IDAY,J)=UNDSIN(J)

IN(5,IDAY,J)=RDSIN(J)

IN(6,IDAY,J)=TGSIN(J)

IN(7,IDAY,J)=IN(7,IDAY,J)+UNITAU(I,J,2)

IN(8,IDAY,J)=PERARR(J)

IN(9,IDAY,J)=IN(1)+IN(2IN(3)

IN(10,IDAY,J)+IN(4)+IN(5)+IN(6)

IN(11,IDAY,J)+IN(7)+IN(8)

OUT(21,D,T)-Summary report array

```
OUT(1,IDAY J)=PWRS(J)
   OUT(2,IDAY J)=TSTOCK(1,J)+TSTOCK(2,J)
   OUT(3,IDAY,J)=OUT(3,IDAY,J)+UNITOH(I,J,1) THTRSM(I,1)=1.0

OUT(4,IDAY,J)=OUT(4,IDAY,J)+UNITOH(I,J,1) THTRSM(I,1)=2.0

OUT(5,IDAY,J)=PRMLOS(J)
   OUT(6,IDAY,J)=UNECON(J)
   OUT(7,IDAY,J)=TRANST(J)
   OUT(8,IDAY,J)=OUT(8,IDAY,J)+MCC1(I,J,1,1)+MCC1(I,J,1,2)

OUT(9,IDAY,J)=MCC2(1,1,J)+MCC2(3,1,J)

OUT(10,IDAY,J)=MCC2(2,1,J)+MCC2(4,1,J)

OUT(11,IDAY,J)=OTUNDS(J)

OUT(12,IDAY,J)=OTRDS(J)

OUT(13,IDAY,J)=OTGS(J)

OUT(14,IDAY,J)=(14,IDAY,J)+UNITOH(I,J,2)THTRSM(I,1)=1.0

OUT(15,IDAY,J)=PERLOS(J)

OUT(16,IDAY,J)=HOSP(J)

OUT(17,IDAY,J)=TPERS(1,J)+TPERS(2,J)

OUT(18,IDAY,J)=PTRANS(J)

OUT(19,IDAY,J)=OUT(19,IDAY,J)+OUT(L,IDAY,J)L=1,10

OUT(20,IDAY,J)=OUT(19,IDAY,J)+OUT(O,IDAY,J)L=8,13

OUT(21,IDAY,J)=OUT(21,IDAY,J)+OUT(L,IDAY,J)
                  L=14,18
```

DELTA(3,D,T)-Summary report array

DELTA(1,J,KTYPE)=ABS[IN(9,J,KTYPE)-OUT(19,J,KTYPE]

DELTA(2,J,KTYPE)=ABS[IN(10,J,KTYPE)-OUT(20,J,KTYPE]

DELTA(3,J.KTYPE)=ABS[IN(11,J,KTYPE)-OUT(21,J,KTYPE)]

QCAP(3,D,T)-Summary report array.

QCAP(1,IDAY,J)=REPRAT(1,J)
DS repair capacity.

QCAP(2,IDAY,J)=REPRAT(2,J)
GS repair capacity

QCAP(3,IDAY,J)=PWRSRT(J)
War reserve output rate.

COMMON/NONARR/

DAYPRM	See subroutine UNSTAT.
DLYSTA	The number of days of delay prior to the commitment to the FEBA of an on-station combat unit.
DLYPOM	The number of days of delay prior to the commitment to the FEBA of a newly arrived POMCUS unit.
DLYCON	The number of days of delay prior to the commitment to the FEBA of a newly arrived CONUS unit.
DDAY	The day combat computations are commenced.
DLYHOS	The number of days of delay prior to the return of hospitalized personnel to the theater personnel pool.
DLYSUP	The number of days of delay prior to the arrival of any resupply equipment from theater stocks to the combat units.

DLYPER — The number of days of delay prior to the arrival of replacement personnel from the theater personnel pool to the combat units.

DLYMAI — The number of days of delay prior to the arrival of any combat unit associated direct support maintenance.

KDAY — The number of days for each run.

NMATE — The number of rows in the array MACAPT.

PERMS — See Subroutine UNSTAT.

COMMON/SSAVE/

See tables in subroutine SSAVE

COMMON/TANKS/

TANK — The total number of days vehicles of type 1 are committed.
Let C_i be the number of tanks committed on day i, then

$$TANK = \sum_{i=0}^{KDAY} C_i$$

, where KDAY is the number of days for each run.

GS — The initial strength, in theater, of a GS maintenance unit in manhours per day.

GSS — The number of GS maintenance units assigned to perform a supply role during the current cycle.

COMMON/TOTS/

NUNITS	The number of units in the computational procedure
NTYPES	The number of types of equipment for each and every unit. Also the number of types of personnel.
NMAINT	not used(?)
NMATYP	not used(?)
NSPUNT	not used(?)
NSPTYP	not used(?)
RELOC	The time in the computational procedure when all GS maintenance units performing a supply role are reassigned to perform a maintenance role.
GSUS	The number of GS maintenance units performing a supply role.

INTLC INPUT CONSTANTS

NARRS	---
NRESUP	The number of war reserve supply events.
NRPEL	The number of reserve replacement personnel events.
NARRMS	The number of type eight events input.

APPENDIX H

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GLOSSARY OF TERMS

1. ABBREVIATIONS, ACRONYMS, AND SHORT TITLES

CEGE	Combat Equipment Group, Europe
CODAM	Combat Damage Assessment Model
CS	combat support
CSS	combat service support
D-day	deployment day
DPPG	Defense Policy and Planning Guidance Memorandum
DS	direct support
FAS	ODCSOPS Force Accounting System
FPE	firepower equivalent
FPP	firepower potential
GER	Germany
GS	general support
GRSA	Germeschein Storage Activity
KAD	Kaiserslautern Army Depot
MMC	materiel management center
MOE	measures of effectiveness
NORTHAG	Northern Army Group, Europe
Pact	Warwsaw Pact
POMCUS	prepositioning of materiel configured to unit sets
PWRMS	prepositioned war reserve materiel stocks
RDD	required delivery date

REFORGER	Reinforcement Force Germany
RFI	ready for issue
PMDL	Post Mobilization Day Deployment List
SRC	standard requirements code
TAA	Total Army Analysis Study
TPFDL	Time Phased Force Deployment List

2. MODELS, ROUTINES, AND SIMULATIONS

CEM	Concepts Evaluation Model. A fully automated, deterministic computer simulation model which portrays theater-level, nonnuclear warfare between two opposing forces along a continuous FEBA.
FASTALS	Force Analysis Simulation of Theater Administrative and Logistics Support. A model which computes time phased administrative and logistic workloads for an active theater and rounds out the force structure with the minimum number of doctrinally required support units to perform the workload.
TRANSMO III	Transportation Model III. A model which simulates the movement of units into a theater of operations. Model characteristics include the capability to simulate attrition of personnel and equipment enroute to the theater. TRANSMO III includes explicit convoy simulation.
BALFOR	Balanced Force Model.
GASP IV	A FORTRAN simulation language for discrete and continuous simulations.